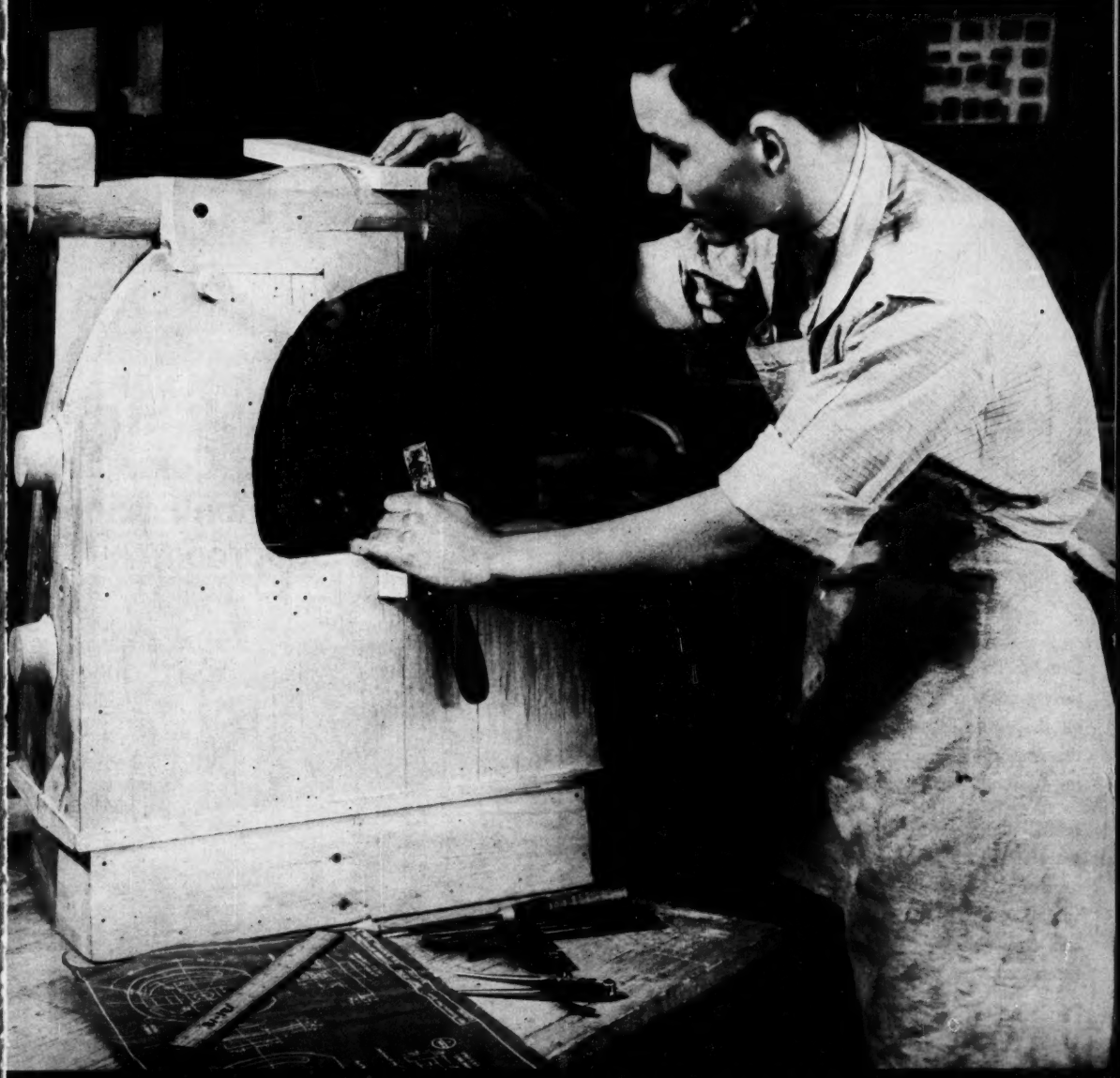
School Shop

vol. XI no. 3
NOVEMBER, 1951

Looking Ahead in Vocational Education
by Raymond W. Gregory
Students Can Apply Good Design
by D. W. Lewis
Evaluate Your Industrial-Education Program
A Simple Shop Foundry
by Oldenburg and Johnson

On the cover: Patternmaking student in the Cleveland, Ohio, schools. See page 5 for a discussion of the outlook for vocational education for students such as this one.



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Next month your editors plan to give you an article describing the ceramics program in the general shop as well as a number of attractive projects. Your old friend Jigsaw Jones begins a new series of misadventures in the popular cartoon feature. Don't miss the December issue!

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School Shop

FOR INDUSTRIAL EDUCATION TEACHERS

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School Shop is published monthly, September through June, at Mount Morris, Illinois. Manuscripts are paid for at regular space rates and should be addressed to the Editor, School Shop, 330 South State Street, Ann Arbor, Michigan. Subscription rates, $3.00 a year; Canadian, $3.00 a year; foreign, $4.00 a year. 50 cents a copy for the April issue. Others 40 cents a copy. Printed in the U.S.A.

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Advertising Sales Offices: Midwest—School Shop, 53 West Jackson Blvd., Suite 447, Chicago 4, Harrison 7-9659. Eastern—Macintyre-Simpson & Woods, 101 Park Avenue, New York 17, Lexington 2-8998. Acceptance under section 34.64, P. L. and R., authorized.

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School Shop TALK

COMMENTS ON ISSUES FACING INDUSTRIAL EDUCATION

How Good Are You?

Some teachers are good, others are not so good, but few teachers could bat 100 percent on all of the factors which make a teacher good, bad, or indifferent.

Because of their background some teachers are excellent craftsmen, and gain the respect of their pupils because of the skill they display in performing the operations common to the field in which their subject lies.

Others show evidence of neatness in the surroundings in which they hold their classes. The floor, the machines, and the other tools and equipment are immaculate and everything is in a place specially designed for it.

Still others are ingenious in devising gadgets to simplify the work of the pupils, or in preparing visual aids with which to make more meaningful the lessons they present. Then too they are able to design and obtain all kinds of storing devices with which to house equipment, unfinished work, material, and supplies. This makes for orderly procedure in operation, and it eliminates confusion at the beginning and at the end of a period.

Then we find some who are organizers. They have the faculty of being able to organize the personnel of their classes so as to create an excellent team spirit. By this means they are able to delegate much of the leadership function necessary in a class to individuals who show evidence of ability.

And we have teachers who are using excellent instruction sheets or study guides as aids in their teaching. These individuals have spent a great deal of time and effort in preparing this material, and have displayed an understanding of their objectives which is altogether too rare among teachers of industrial arts.

And so it goes, each teacher, even the poorest, is likely to have something that tends to make his teaching more meaningful. But the teacher who has the greatest assets is the one who loves children, who has unlimited patience, and who has an understanding of the peculiar urges that make children what they are. To those teachers who are blest with these rare gifts, the features mentioned above are incidental and serve only as secondary aids in the teaching process.

It is not assumed that any one teacher possesses these attributes in the same degree, but he may have two or more in any combination. It is suggested, therefore, that each teacher examine himself for the purpose of discovering those in which he excels, as well as those in which he is weak. When this has been done he can make the most of his strengths, and, at the same time, strive to strengthen his weaknesses.

When the teacher fails to analyze himself in order to discover his assets and his liabilities he is likely to go through his teaching career calmly and comfortably, but his progress in his profession is sure to be slow.

Selfanalysis is a profitable enterprise any way one looks at it, and it is one that need embarrass no one since the subject is the only one who knows the results. Then too the results are likely to be accurate if one is objective.

There are a number of selfanalysis forms in industrial-arts literature. Any one of these may be used. If they are unsuitable, a teacher can still decide for himself what he considers to be the things that make for better teaching. Then, on the basis of his own scale, he can decide where he excels, and where improvement might be made.—*T. D.*

An Opportunity for Action

There has been much talk but little apparent opportunity for action in connection with Unesco and industrial education until now. A plan has been devised which gives groups of students and of shop teachers an opportunity to participate actively in the reconstruction program which Unesco is undertaking in under-privileged and under-developed territories.

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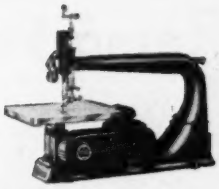

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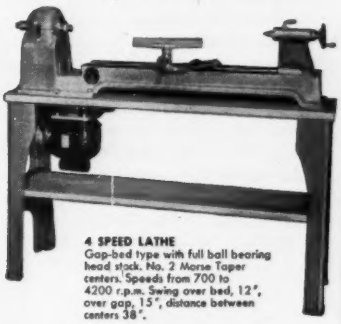

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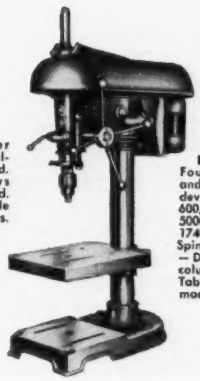

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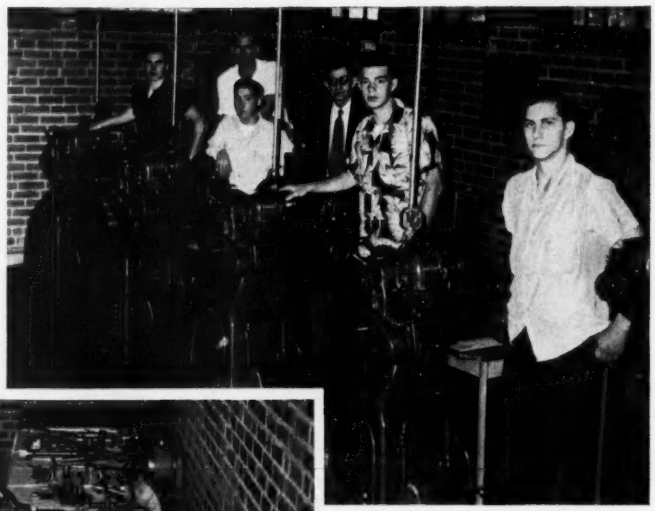
Machine Shop Students Make Remarkable Advancement Record

This country's industrial future will some day be in the hands of the youth who are students today. When we contemplate the responsibility that the future will hold for them, the present responsibility of vocational training commands greater respect. Consequently, all progress towards more effective training is a source of satisfaction not only as career insurance for students but as another step towards a more efficient industrial economy.

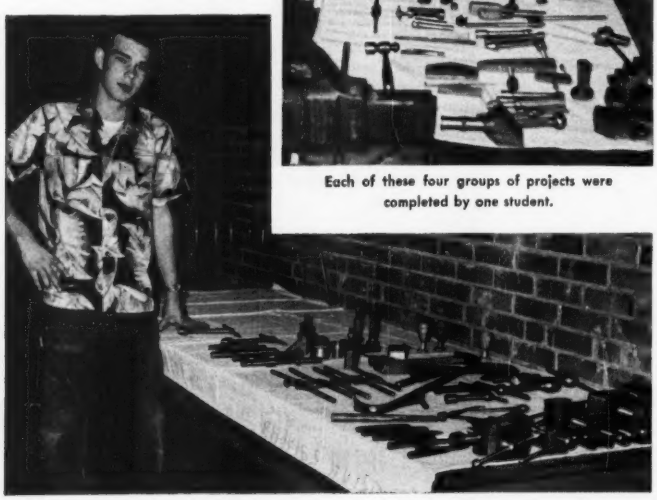


Students with their shop instructor, Mr. S. P. Ward.

Thorough Training Pays

An outstanding example of student advancement has recently come to our attention. The students pictured here constituted the machine shop class of the Leavelle McCampbell High School of Graniteville, S. C. The displays of projects that they have completed during the past school year is remarkable proof of their rapid advancement. Such an achievement is testimony to what can be accomplished through thorough training. The credit for this is due their instructor, Mr. S. P. Ward. There should be no concern about industry's future when training records such as this are being achieved.

Each of these four groups of projects were completed by one student.



Student with projects completed during year.

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Highly important to the efficiency of any vocational course is the selection of the right equipment. In this school, as in countless secondary schools, universities and trade schools, South Bend Lathes are preferred. Shop instructors have long known that their ease of operation, simplified design, versatility and accuracy make training easier as students become adept at machine handling faster. Also, they are widely used in industry which makes training more effective—re-training on the job is often eliminated.

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Looking Ahead in Vocational Education

By Raymond W. Gregory

Vocational education must keep abreast of technological and scientific change if it is to meet its purpose of qualifying people for work in industry, contends the author. He sees a long pull ahead despite great progress to date, and puts his finger on some serious shortcomings of present-day instructional programs. Mr. Gregory is Assistant Commissioner for Vocational Education in the U. S. Office of Education, Washington, D. C. This article is taken from a talk which he gave at the School Administrators' Vocational Education Workshop at the University of Michigan, Ann Arbor, July 20, 1951.

WE are proud to report that in 1950 there were approximately 3.4 million enrolments in schools and classes in all types of federally-aided vocational classes in the 48 states, Hawaii, Puerto Rico, and the District of Columbia. (Just last year the benefits of the National Vocational Education Acts were extended to the Virgin Islands.) The states and local schools expended slightly more than $129,000,000 for federally-aided types of vocational education. This is big business even in education and represents a creditable achievement in the 34 years since the passage of the Smith-Hughes Act in 1917.

But in spite of this growth much remains to be done. It would appear that the task ahead far exceeds the previous accomplishments. Vocational education still remains to be introduced into approximately half of the public secondary schools of this country. In the main these are the small schools, isolated and farthest removed from centers of economic and productive development.

More Emphasis Needed on Trade Experience

There are, and will continue to be, changes in the growth and development of vocational education, changes in direction, emphasis, rate, and reach. May I call your attention to a few of the more perceptible ones of today?

We have come to emphasize the professional preparation and upgrading of vocational teachers at the expense of technical and work experience preparation. Practically the whole of our upgrading service for vocational personnel is professional in character. Teachers should be encouraged to work in industry, business, home, and on the farm with greater frequency in order that they may revitalize their sensitivities to work problems, responsibilities, and conditions of employment.

One of the chief assets of a successful teacher in vocational education is the profound respect of his students for his own competence as a worker in the field he teaches. It is equally true of supervisors and teacher trainers. But all too frequently we labor under the burden of the characterization, "He couldn't make a living at it to save his life." Too much of that kind of talk, or too much truth in it, lessens the opportunity for vocational education to live up to its responsibility "to fit for useful employment."

Students Are Older

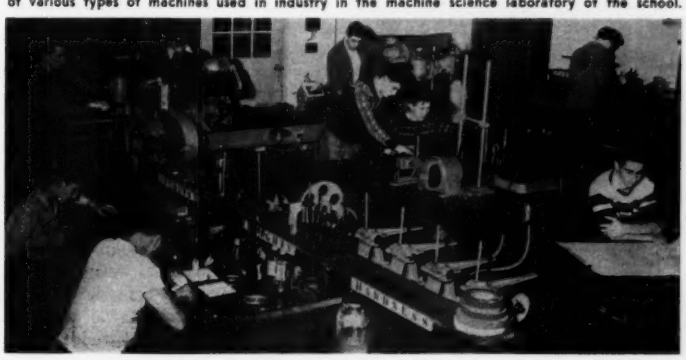
Annually the average age of students enrolled in all-day classes in vocational education increases. Gradually entrance into vocational schools and classes by high-school boys and girls is being postponed until the tenth and even the eleventh year of school. Factors affecting this change are many but these in particular are outstanding. The age at which young people may enter full-time employment continues to rise. State laws on school attendance and child labor have been important in this respect. Both labor and management in industry have increasingly favored youth remaining in school and out of the labor market until they are better prepared and more mature.

The maturity of the population in the United States has been increasing, thus making job getting for under-age boys and girls a matter in many instances of competing with older workers who have family and other responsibilities. The growing need for skilled workers and supervisors to have a greater fund of technical and scientific knowledge with which to undergird their skill and management has made it worthwhile for persons preparing for these trades to secure such instruction while in the high-school age bracket, thus extending their period of formal training farther into their young adult years. Teachers, supervisors, and administrators need to take serious cognizance of this trend and check the level of student maturity at which their instruction points.

Vocational education becomes increasingly integrated in the secondary school, and experiences pressures to conform to its pattern and routines. This is natural and to be expected, but it is not "all to the good." Standard lengths of class periods, time spent in shop and laboratory, opportunities to work with, and relate, instruction to conditions and routines of industry and business, time and facilities for field observation, work experience and occupational content determination, standard qualifications for teaching certificate, promotion, and salary increases—all are illustrative of trends in this respect, most of which make it difficult to fit the instruction to the particular needs of the pupil in the occupational area of his choice.

As a larger and larger proportion of those of secondary-school age enroll and remain in school it becomes increasingly imperative that we have *greater* flexibility and differentiation in our operational, administrative, and organizational patterns, rather than less. If we find it difficult to accommodate a mere 20 percent of our student body organizationally and operationally what will we do when the other three-fifths, whose needs are not now being met, remain in school and expect the school to be conditioned

Skilled workers today need "a greater fund of technical and scientific knowledge," contends the author. These students in the Newton, Mass., Trade School are getting an insight into the nature of various types of machines used in industry in the machine science laboratory of the school.



Vocational instruction should reflect the skills and abilities needed in competitive industry and business, otherwise trainees' claims to job competency may be destroyed. This student at the Emerson Vocational High School, Buffalo, N. Y., carefully performs an important machine-shop operation—internal shaping.

to their needs, occupationally, socially, economically, and educationally?

Standards Don't Reflect Industry

The net result of these trends is that the standards for vocational instruction are becoming the reflection of problems in administrative management and school operation rather than of skills and abilities necessary in a competitive free economy for job getting and job holding. This carried too far will weaken and may destroy the claim for job competency on the part of the student.

Vocational education has sponsored training supplementary to production through the Future Farmers of America and the Future Homemakers of America. In recognizing the specific needs for training in cooperation, leadership, organization, citizenship, and other similar related responsibilities of farmers and homemakers, leaders in vocational education in agriculture and homemaking have strengthened the total educational opportunities for boys and girls choosing these occupations for their life work. Such educational activity should be an integral part of *every* program in vocational education.

Community-Wide Surveys Reveal Training Needs

There is a growing concern among workers in vocational education for the common interest among the various vocational programs. While individual occupational surveys are still important and valuable in local curriculum building, even more important for basic foundation planning are community-wide surveys made to reveal the total productive and service industries and the whole need for occupational training among the local people with respect to them. Education to be meaningful for *all* of the people makes mandatory consideration of *all* productive, social, cultural, and otherwise beneficial resources of the community in which they live.

Continuing Education Needed

Leadership in vocational education becomes increasingly committed to the principle that vocational education, to be most effective, not only must have immediate values but must lay an even firmer foundation for the necessary continuing and refresher education of tomorrow and the extended future. More and more do we see evidence of how all-day instruction in certain skilled trades becomes the finest of pre-apprentice training for the young student entering industry by that route. At long last, probably stimulated by the success of the institution-on-farm training for veterans, part-time instruction for out-of-school young farmers who were enrolled in vocational agriculture classes while in high school is making rapid developments. Greater appreciation is being manifested of the impact on vocational education outcomes of prevocational training in such fields as elementary agriculture, junior-high-school home economics, and freshman courses in general shop and industrial arts.

One of the most important trends in vocational education is the financial support being given by states and local communities in relation to that afforded by the federal government. From the very beginning the ratio has constantly widened until in 1950 it was practically at 3 to 1 in favor of the state and local effort. It becomes clear soon after any vocational education is introduced into a local school program that the money expended does not represent a cost but is an investment. In addition to being good education it is smart business. The only way I know for a local school administrator to get more financial support for his school is to get it out of the increased productivity of his local economy. That increased productivity should not be left to chance.

Realistic Teacher Training

No school can be superior to the teachers it employs. Teaching requires the training of teachers if it is to be well done. During the last several years much progress has been made in vocational teacher training through directed or practice teaching. In advanced circles it has become the accepted practice to assign teacher-training students for this phase of training to a selected school where the trainees will live for an extended period of time and where they will be expected to become integrated in the life of the community and in the activities of the whole school.

This is in recognition of the fact that vocational instruction, limited to the narrow limits of classroom or shop, tends to become unrelated to the industry it is set up to serve, and that from the very beginning, teachers should have experiences in making the proper contacts and developing the necessary relationships with the economic and social institutions of the community in which they teach.

School and Community

A few years ago an educator in addressing one of our life-adjustment education groups in Washington, concluded his remarks by saying, "There is a chasm between the school and community which needs to be bridged." I agreed to this but begged to amend his statement by adding, "and the school moved over into the heart of the community and the bridge burned." That, in my judgment, will be the dominating characteristic of any vocational-education effort in the future; a "centralness" in the life of the community it is to serve. From such a strategic position there accrue to any educational program many advantages. It cannot help being sensitive to its environment and becomes synonymous with it.

People support what they know and understand, if it is worthy of support. Vocational schools and classes central in the community life are like open books. Being thus exposed to the review and appraisal of the people of the community they dare not be "unclean" in practice or purpose.

Students Can Apply Good Design

By D. W. Lewis

Practical exercises by the student in applying basic rules of good design to his own projects are needed, says the author. This teaching unit, which he has used successfully, includes suggestions to the teacher, two special assignments, an information sheet, and a test. The photos illustrate design principles. D. W. Lewis teaches shop in the Columbus, Ind., High School.

OFTEN the industrial-arts teacher finds that his students have little understanding of whether their projects are of good design. Altho this problem is sometimes solved when they choose projects from a worthy book or magazine, it still behooves us as teachers to acquaint students with rhythm, balance, proportion, and qualities of structural and decorative design. As we well know, memorization of a few rules does not mean that they can practice correct methods. Exercise is needed.

High-school art work delves into design, color, harmony, balance, emphasis, proportion, etc., but the objectives and the project work in art are often entirely unrelated to industrial-arts shop work, which results in very little transfer. However, I believe that in the study and practice of industrial-arts design some transfer of the learning in art will be effected. Here is indeed opportunity for industrial-arts and art teachers to cooperate and be mutually helpful.

It is not wise for the shop teacher to rob his students of much work time. E. E. Ericson, in his book *Teaching the Industrial Arts*, says that probably not more than 25 percent of the class time should be taken for related work. And I believe that most shop teachers are inclined to agree. Therefore, we must dovetail our study of design with shop practice, study of materials, history of tools, finishing methods—in short, with all the related information which is necessary to accomplish the objectives of the course.

This teaching unit of industrial-arts design is composed with just that intent. Yet it gives the student exercises in design; it brings to his attention the vast panorama of design of products in the commercial fields; and most important of all, it teaches him a few fundamental laws of design that he can understand and use himself. The information sheet can be put in the student's notebook for ready reference and the test will induce some memorization which will be useful at the workbench.

This end table is 29½" high—low enough to keep the lamp shade below the eyes of the person sitting nearby, yet high enough to fully illuminate the book or paper being held. The shelf is 18½" high. The curved sides add rhythm to the other straight lines. Oak with a lime finish, now popular in furniture, was used.

Design Teaching Suggestions

1. Have each student study the information sheet on design.
2. Acquaint the students with several references dealing with design in the industrial arts.
3. Discuss the information sheet.
4. Have each student make a study of the design of some particular article which is commonly seen and used in his everyday living. Have him look especially for different models, styles, or adaptation of the same article; for instance, the many models of refrigerators, radio cabinets, silverware, china, desks, living-room chairs, lamps, cameras, couches, dinette tables, etc.
5. Have available many copies of the more common household magazines from which illustrations may be seen and studied by students. *American Home, Better Homes and Gardens, McCalls, House Beautiful,* and *Architectural Record* are profusely illustrated with commercial items for the home.
6. Give the test on design.
7. Have each student develop an original design for a project to be constructed in the shop.
8. Have the fine-arts teacher discuss design from his standpoint for the class.
9. Get someone from the design department of an industry to discuss for the class how the industry develops the designs for its products.

Following are some sample student assignments, information sheet, and test:

FIRST ASSIGNMENT

Purpose—To learn some principles of design, factors which influence design, and some different kinds of design.

1. Define design and explain its purpose.
2. What part does design play in present-day industries?
3. How does structural design differ from decorative design?
4. List five rules for structural design.
5. List five rules for decorative design.
6. Explain how function helps shape design.
7. Name at least five manufactured articles and explain how function helped shape their design.
8. In what way might material influence design? Name at least two examples.
9. Name five principles of design.
10. Define proportion, contour, balance, rhythm, emphasis.
11. Why is a rectangle of 2:3, 3:5, or 5:8 of pleasing proportion?
12. List five rules for pleasing proportion.
13. List four rules for good contour.
14. Explain the difference between formal and informal balance.
15. How is the movement of the eye controlled in design?
16. How is rhythm created in design?
17. How does emphasis in a design help create interest?
18. Why should the finish applied to a completed project be a part of the planned design?
19. Define hue, value, intensity, tint, and shade in colors.
20. Name the primary colors and explain how the secondary and intermediate colors are obtained.

References:

Bradley, Charles B., *Design in the Industrial*

This chest of drawers is 37" x 24", forming a front rectangle ratio of 2:3. Drawers are of equal depth, not conforming to rule. However, the polished brass drawer pulls divide the front into three vertical sections, offsetting the other effect. Driftwood finish subdues the horizontal lines, accentuating the brass drawer pulls.

Arts. Peoria, Ill.: The Manual Arts Press, 1946.

Greeley, *Design*. (Practical Arts Series.)

Varnum, William H., *Industrial Arts Design*. Peoria, Ill.: The Manual Arts Press, 1948. (3rd Ed.)

Second Assignment

Purpose—To learn the application of design principles to various articles, especially those used in everyday living.

Instructions—From a magazine, newspaper, or other source select, clip, and paste (or draw) the following items. Label each and answer these questions:

1. Two articles illustrating good structural design. Explain your choice.
2. Two articles illustrating good decorative design. Explain your choice.
3. Three articles whose design has been shaped by their functions. Explain how.
4. Two articles of good rectangular proportion. Indicate whether each is near the proportion of 2:3, 3:5, or 5:8.
5. One article illustrating formal balance, and one showing informal balance. Explain the difference.
6. One article illustrating good contour. Explain your choice.
7. One article illustrating rhythm in design. Indicate whether the rhythm is caused by line, form, or color.
8. One article illustrating emphasis in design. Indicate where it occurs.

Instructions—Make the following and answer the questions.

9. Make a color wheel illustrating the primary and secondary colors. (Use colored pencil or crayon.) Include the intermediate colors if you wish. If you could have but three colors which would you choose? Why?
10. Make a working drawing of an article you have made or could make in the shop. Indicate how the design principles of proportion, contour, balance, rhythm, and emphasis apply to the design.

References:

Bradley, Charles B., *Op. Cit.*

Greeley, *Op. Cit.*

Goldstein, H. and V., *Art in Everyday Life*. New York: The Macmillan Co., 1926.

Sample Information Sheet

General — Design — how something looks — plays a tremendous part in our present-day industries. A salesman or inventor knows that his product will not sell unless it is well-designed for its intended use. Today products must be both useful and beautiful.

Remember that *design is not an isolated study*. It is something that grows out of and belongs to the article you are making. With an understanding and appreciation of design you can make objects from metal, clay, wood, plastics, etc., of good form and pleasing lines which will greatly increase their value and beauty.

Design is a combination of good workmanship and materials with the proper use of proportion, balance, rhythm, emphasis, and color. These combine to make a harmonious, useful, and beautiful decorative or structural design.

Kinds of Design—There are two different kinds. One is called structural design and the other is called decorative design.

Structural Design—Think of a structure. You perhaps see a building, table, chair, desk, machine, or some other object. Here you have the meaning and an application of structural design. It refers to the object itself; to its shape or mass arrangement. To fulfill good structural design requirements, the object should:

1. Serve with good results the purpose for which it is intended.
2. Look strong and serviceable for its intended use.
3. Be pleasing in general size and shape.
4. Fit appropriately into its surroundings.
5. Have parts which "fit" together. (Projections such as handles, ash containers, cranks, legs, etc., sometimes look as if they had been "stuck on.")

Here are some types of poor structural design you are likely to find:

A. A cup with the handle so small you cannot hold it.

B. Book ends too light in weight to hold books without sliding.

C. A table which does not look strong and serviceable because the legs are too slender for the support of the top.

D. A flower vase which appears to be "top-heavy."

E. A chair that stands out so it is the first thing anyone notices on entering the room. It may have poor structural design, or be colored in poor taste with its surroundings.

F. An ash stand representing Popeye holding it up. Usually objects of utility should not be made in the form of animated things.

Decorative Design—This is added to an article after it has been planned structurally. This decoration or ornament is intended to make the object more pleasing in appearance as well as more efficient for its use. Keep these points in mind concerning decorative design:

1. If the best materials are used with good workmanship, objects of utility need but little ornamentation. Good structural design has a beauty of its own.
2. Objects whose only purpose is for decoration may be effectively decorated.
3. Decoration may be added to a plain surface if it does not interfere with the function of the article.
4. In general, the decoration should follow the shape of the object. If the object is circular, the decoration should follow that shape.
5. Imitation is the cheapest kind of decoration, and should be avoided.

Factors Which Influence Design — Objects cannot be well designed without considering factors which will influence the design. Some of these are: The intended use of the article, the materials which will be used in its construction, and whether the object will be hand-made or machine-made.

Function—Anyone attempting to design and make a canoe paddle would find it difficult to be original. The design of the present-day canoe paddle is the result of many years of slow change in its structural design. The final result is a paddle of graceful form which is most efficient for its intended use.

Other articles whose design has in part been shaped by function are the claw hammer, a pair of shoes, a snow shovel, high-top boots, a bicycle, a milk bottle, a pencil, a violin, a rifle, a light bulb, a chimney, etc.

Material—Industrial designers select the best material available at a cost which will provide a profit to the manufacturer and satisfaction to the buyer. The essential requirements are suitability to purpose and durability. It should be remembered, however, that inferior materials and methods of construction are sometimes used in order to meet competition.

Some articles whose design has been influenced in part by materials are tubular metal chairs, plastic radio cabinets, wood tables, and a wire fence.

Construction Processes—It is probable that no two hand-made objects will look exactly alike or be as mechanically perfect as machine-made products; it is not expected of them. On the other hand, machine-made products are expected to have smooth surfaces and be exact in size and operation.

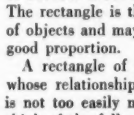
A hand-made article such as a carved figure might well be any design the craftsman wanted, while the design of a radio cabinet would have to conform to the machine which helped make it. The tremendous quantity of machine-made articles in our present-day living has done much to bring about simplicity and fewer frills in design because of the limitations of machines when speed and quantity are all-important. Machine processes have changed design to be smooth, straight-lined, and simply constructed. Intricate carvings, fancy incisions, superfluous decorations are becoming less and less in good taste.

Principles of Design—The experience of designers has led them to recognize certain principles which are helpful in causing constructed articles to appear more beautiful. Some of these principles are proportion, contour, balance, rhythm, and emphasis. A brief explanation of these principles will be given.

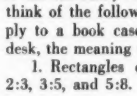
Proportion—Relationship between dimensions or between areas or parts is called proportion. The rectangle is the basis for a large number of objects and may well be used here to study good proportion.

A rectangle of pleasing proportions is one whose relationship between height and width is not too easily measured by the eye. If you think of the following rules as they might apply to a book case, a chest of drawers, or a desk, the meaning will be more clear to you.

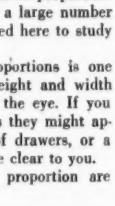
1. Rectangles of pleasing proportion are 2:3, 3:5, and 5:8.



Proportion of 2:3



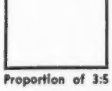
Proportion of 5:8



Proportion of 3:5

2. If an object longer than it is high is to be divided into two parts, divide it either *above* or *below* the center.

3. If a rectangular object is to be divided into several parts horizontally, they may start larger at the bottom and gradually become smaller, progressing upward.



4. If a rectangular object is to be divided vertically into two parts, they should be of equal area and similar in shape.

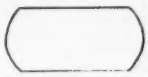
5. If a rectangular object is to be divided vertically into three parts, the center should be larger and the other two of equal size, similar in shape.

Contour—The contour of an object determines how it will "look." Questions we might ask are: How shall the outline or shape be determined? If the object is curved, what kind of lines should be used? If the object is essentially straight, should all straight lines be used? The following rules will help in determining

the contour or shape of the object:

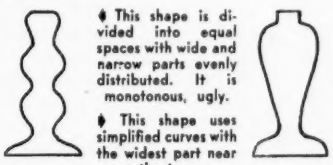
1. Place the widest part either above or below center.

Widest part above center.



Lacks variety; widest in center.

2. Keep the shape simple. Many bulges, bumps, ridges, furrows, or grooves are confusing, monotonous, and show poor taste. Good design has applied simplicity and esthetic appeal. The viewer's eye is led along an interesting journey over the contour of the article. Changes in the angle of the curve are noticeable; it represents a "curve of force" for the observer.



♦ This shape is divided into equal spaces with wide and narrow parts evenly distributed. It is monotonous, ugly.

♦ This shape uses simplified curves with the widest part near the top.

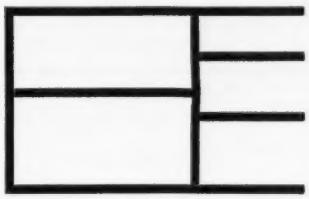
3. The use of all straight or all curved lines in a drawing or object contour makes for monotony. Use mostly one type of line, adding enough of another to break the monotony. Refer to the examples in the pictures or, better still, make some sketches of your own and use your judgment on them.

4. A curved line is more beautiful if its curve is more abrupt at one end. This appears to more definitely establish the contour of the object to the viewing eye, preventing monotony or haphazard appearance.

Balance—An object which is said to be "lop-sided" or "top-heavy" does not look right because it violates the principle of design called balance. There are two ways of obtaining a balanced feeling in any arrangement or design. One is called formal balance; the other is called informal balance.

Formal Balance—When you plan a formal arrangement, you make everything on each side of the center or axis of symmetry exactly alike. Perhaps the mantle in your home is arranged with a clock in the center and a candle holder on either side; this is formal balance.

Informal Balance—An informal arrangement must appear balanced but does not need to be exactly alike on both sides. A heavy piece of furniture like a davenport may be balanced by a chair, lamp, and radio placed across from it in a room arrangement. Informal balance is a balance for appearance and not for equal weight or duplication on each side of the axis of symmetry. Below is a drawing showing informal balance in the design of an end-table or bookholder.



Rhythm—Eye movement is controlled in design by rhythm. When we look at an object, the eyes rest either in one place or move about as attracted by the object or view in sight. One of the easiest ways of "leading" the eyes is by repeating a form, color, or line. The figure of the chair (right) is an example of rhythm in design.

Emphasis—In order that a design may be seen as a whole, rather than as a collection of parts, there must be a focus point or center of interest created by "emphasis." Emphasis may be achieved through proportion, balance, rhythm, or a combination of the three. Other things such as colors are also used to create emphasis. Study the figures on the previous pages for examples of emphasis in design. Also study articles in the immediate environment.

Color and Design—The finish to be applied to a completed project *should be a part of the planned design.* The type of finish to be applied may be determined by the use for which the object is intended, the nature of the material used, the necessity of providing protection from deterioration, uses of the article, etc.

The color of various materials such as metals, plastics, woods, etc., possess qualities which affect their appearance in a completed product. Color is sometimes inherent in the material and must be accepted, or it may be changed by the application of a colored finishing material such as stain, varnish, or paint.

Color Properties—All color originates in light and without light there would be no color distinctions. Any color may be described accurately in terms of its three qualities. These qualities are:

1. Hue—a color name such as red, yellow, blue. The "hue" distinguishes one color from another.

2. Value—the quality which indicates whether the color is light or dark. White is one extreme in value, and black is the other. Light blue and dark blue are the extremes in value of a blue hue.

3. Intensity—the quality of a color which determines its brightness or dullness.

Primary colors—red, yellow, and blue.

Secondary colors—Orange, green, violet.

Intermediate colors — yellow-green, blue-green, blue-violet, red-violet, red-orange, yellow-orange, etc.

References:

Bradley, Charles B., *Op. Cit.*

Greeley, *Op. Cit.*

Varnum, Wm. H., *Op. Cit.*

Test in Design

1. Name two kinds of design.
2. Define design.
3. (True or False.) If the best materials are used with good workmanship, objects of utility need but little ornamentation.

4-7. Name four articles whose design has been shaped in part by their intended function.

8-9. Name two articles whose design has been influenced by materials used.

10-14. Name five principles of design.

15-17. Name three rectangular areas of pleasing proportion.

18. Tell why the three rectangular areas mentioned above are of pleasing proportion.

19-21. Using good proportion, divide a rectangle into two parts horizontally; two parts vertically; three parts vertically.

22-23. Name two kinds of balance.

24. Define formal and informal balance.

25-27. Name three articles which have formal balance.

28-29. Name two articles which have informal balance.

30. How is rhythm created in design?

31. Why is emphasis necessary in design?

32. "Contour" determines whether the article is tall or short, outline or shape, kind of decoration used, big or little. (Choose correct item.)

33. Name the primary colors.

34. Explain the difference between a tint and a shade.

By Aaron Adams, Marion, Indiana, High School

Evaluate Your Industrial-Education Program

You can get a good idea of how your set-up compares with the ideal by taking a few minutes to rate it on the following scale. This scale was developed by a committee of local supervisors and directors of industrial education in Illinois in consultation with E. M. Claude, Chief of Trades and Industries, State Board for Vocational Education, Springfield.

THE following criterions, listed under 11 classifications, were decided on by a group of Illinois industrial-education leaders in setting up a tentative standard for evaluating industrial-education programs in schools. Questions under each heading are to be answered by checking the position of the school being evaluated on a sliding scale of 1 to 10, ranging from very poor to excellent.

The procedure for scoring involves averaging each section (I, II, etc.) by dividing the total number of points by the number of questions in each section, before going on to the next. The final part of the test provides for a profile of the school's program by listing the various classification headings together with their respective scores, and connecting each of these scores with a straight line.

I

-- Long-Term Planning --

To What Extent:

1. Is your program of industrial education complete-- beginning in elementary or junior-high school, continuing through senior-high school to include apprenticeship and trade extension for out-of-school youth and adults? 1 2 3 4 5 6 7 8 9 10

2. Does your industrial-education budget reflect planning for long-term as well as immediate needs? 1 2 3 4 5 6 7 8 9 10

3. Is there a written plan for the long-term development of your industrial-education program? 1 2 3 4 5 6 7 8 9 10

Total Points _____ = _____ (3)

Score

II. Public Relations

To What Extent:

1. Is your program actively supported by a well informed school administration?

2. Do you make use of the following publicity techniques: open house, exhibits, radio, newspapers, newsletters, pictures—films, shop tours, grade-school P.T.A., freshman day, etc.?

3. Is a program in operation to acquaint civic groups and labor organizations with the purposes and activities of industrial education?

4. Is proper recognition given to trainees for achievement?

5. Are hobby or industrial clubs included in the school's extra class activities?

6. Are those responsible for supervision and instruction engaged in community and industrial activities?

(Add total points, divide by six for score on this section.)

III. Administration

To What Extent:

1. Is your industrial-education program a part of the entire school system?

2. Is your department represented on over-all school planning committees? Curriculum, guidance, correlation?

3. Are the services of the school's guidance personnel available to your program?

4. Are a sufficient number of students served by your program to ensure a reasonable per capita cost?

5. Are your instructors devoting full time to the industrial-education program?

6. Do shop instructors have sufficient time for planning industrial student conferences?

7. Is vocational education placed at the point nearest to the time of employment?

8. Is provision made for students who apparently must soon drop out of school?

9. Is vocational education made available to as many students as possible on the 13th and 14th year level?

(Add total points, divide by nine for score on this section.)

IV. Curriculum

To What Extent:

1. Are the six major industrial-education fields (drawing, metals, wood, electricity, graphic arts, and auto mechanics) represented in your program?

2. Is your program sufficiently flexible so that it may be adapted to meet local and national emergency needs?

3. Does each course allot sufficient time for related instruction to supplement shop experiences?

4. Is safety instruction included in the total program?

5. Has the vocational curriculum been planned in the light of job opportunity for those who complete it?

6. Has opportunity for apprenticeship or cooperative on-the-job training been considered in planning the program?

7. Have specific occupational objectives been established for the vocational curriculum in terms of concepts, skills, and attitudes?

8. Are high-school pupils given at least two years of industrial arts before they enroll in the vocational curriculum?

9. Is occupational information made available to the student *before* he is required to choose a vocational curriculum?

10. Is the course of study in adult classes fitted to the individual needs of the students?

(Add total points, divide by 10 for score on this section.)

V. Facilities

To What Extent:

1. Are your machines, equipment, materials, and supplies representative of the actual industrial situation?

2. Are your facilities adequate in

terms of shop space, equipment, classroom space, study area, storage, texts and references, instructional equipment, including audio-visual aids?

3. Is proper attention given to good shop appearance?

4. With respect to location are shops placed so as not to interfere with other educational activities?

5. Are other educational activities so located as not to interfere with the shop program?

6. Has adequate provision been made for the safety of the student?

(Add total points, divide by six for score on this section.)

VI. Selection of Students

To What Extent:

1. Do you utilize the services of the school's guidance program?

2. Are occupational information and possibilities for employment made available to the student?

3. Are vocational students selected on the basis of their interest and ability to succeed in the occupation (as indicated by personal data, IQ and achievement tests, personality traits, prognostic test results, and records of experiences in industrial-arts courses)?

(Add total points, divide by three for score on this section.)

VII. Placement and Follow-up

To What Extent:

1. Does your school accept and discharge its responsibilities for placement and adjustment of vocational pupils?

2. Does the follow-up program in your school assist in improving the present program?

3. Does the follow-up program help in establishing adult classes to meet the needs of employed persons?

(Add total points, divide by three for score on this section.)

VIII. Records

To What Extent:

1. Are there available complete, useable records of past and present students?

2. Is pertinent data continuously collected on each occupation for which vocational education is provided?

(Add total points, divide by two for score on this section.)

IX. Professional Growth

To What Extent:

1. Are your instructors qualified in terms of practical experience, technical and professional training, personal characteristics essential to the successful teacher?

2. Do the supervisor and instructors attend summer school, conferences, short courses, specialists' meetings, etc.?

3. Do members of the staff write for publications?

4. Do shop teachers keep abreast of technical changes by securing additional work experience in their particular fields?

(Add total points, divide by four for score on this section.)

X. Advisory Committees

To What Extent:

1. Are local advisory committees maintained on vocational offerings?

2. Are both management and labor equally represented on these committees?

(Add total points, divide by two for score on this section.)

XI. Cooperation with Industry

To What Extent:

1. Are programs arranged for employers and personnel managers to talk with pupils?

2. Are employee representatives invited for talks with pupils?

3. Do your instructors keep in close touch with employers and personnel managers?

4. Do members of your staff visit graduates or drop-outs on the job?

(Add total points, divide by four for score on this section.)

PROFILE CHART

SECTIONS	1	2	3	4	5	6	7	8	9	10
I. Long-Term Planning	.	.	.	.	.	.	.	.	.	.
II. Public Relations	.	.	.	.	.	.	.	.	.	.
III. Administration	.	.	.	.	.	.	.	.	.	.
IV. Curriculum	.	.	.	.	.	.	.	.	.	.
V. Facilities	.	.	.	.	.	.	.	.	.	.
VI. Selection of Students	.	.	.	.	.	.	.	.	.	.
VII. Placement and Follow-up	.	.	.	.	.	.	.	.	.	.
VIII. Records	.	.	.	.	.	.	.	.	.	.
IX. Professional Growth	.	.	.	.	.	.	.	.	.	.
X. Advisory Committees	.	.	.	.	.	.	.	.	.	.
XI. Cooperation with Industry	.	.	.	.	.	.	.	.	.	.

Highlights of the Minneapolis AVA Convention

MEETING at Minneapolis, Minnesota, November 26 to December 1, the American Vocational Association anticipates a record attendance at its 45th Annual Convention.

Most convention sessions and the commercial and educational exhibits will be held in the Minneapolis Municipal Auditorium.

Among the featured speakers on the general programs are Henry G. Bennett, Administrator of the Technical Cooperation Administration (Point Four program); U. S. Senator Hubert Humphrey of Minnesota; Dean M. Schweickhard, Minnesota State Commissioner of Education; and Minnesota Governor C. Elmer Anderson.

Among the programs of particular interest in industrial education and industrial arts are the following:

Monday, Nov. 26

The National Association of Industrial Teacher Trainers will hear a description of the Chrysler program of cooperative training and the Ford Industrial Arts Award program in the morning. In the afternoon, "How We Learn" will be discussed by M. Ray Karnes, University of Illinois; "Lesson Planning" by A. A. Vezzani, University of Michigan, and "Evaluation Procedures" by S. Lewis Land, Pennsylvania State College, will be presented.

The National Association of State Supervisors of Trade and Industrial Education has sessions planned for both morning and afternoon.

Tuesday, Nov. 27

A joint meeting of the state supervisors, the teacher trainers, and the local directors will be held to discuss "The Comprehensive (Cosmopolitan) High School."

In the afternoon the teacher trainers will hear several papers on "What Does Research Say?" while another group holds a session on industrial-arts teacher training. At the same time the National Conference of State and City Supervisors of Industrial Arts will discuss the topic of expanding and improving supervisory services.

The National Association of State Supervisors of T & I has a session in the afternoon on "Clarifying the Relation of the State Vocational Department and the Federal Apprentice Training Service" with federal and state officials participating.

Wednesday, Nov. 28

The Trade and Industrial Education Section has a morning session devoted to "The Task Ahead in a Changing Economy" with J. Seidel, R. W. Gregory, M. Reed Bass, L. S. Hawkins, and J. C. Wright participating. In the afternoon one group will discuss cooperative train-

ing programs while another will be concerned with "The Training Needs of Girls."

An afternoon session will also deal with "Recent Developments and Policies in Defense Training" with Dr. Arthur S. Flemming of the Office of Defense Mobilization participating.

An automotive group tour and luncheon is planned for the T & I Section followed by a session on training for the industry.

The Industrial Arts Section has parallel sessions scheduled in the morning with one devoted to demonstrations of aluminum and silver forging by Marshall Byrn of the University of Michigan and another by Dewey Barich of Kent State University. The other session will be on accreditation of industrial-arts teacher training.

In the afternoon the demonstration sessions will be on Indian silversmithing and on plastics while the other session will cover practice teaching for industrial arts.

Thursday, Nov. 29

The IA Section will hold a demonstration meeting on design with a discussion on in-service training. Another morning group will hold a discussion on pupil personnel practices and hear a talk by John R. Ludington of the USOE.

The T & I Section will hold one afternoon meeting on training instructors for industry while another group will discuss "The Criteria for Evaluation of Vocational Programs for Girls." Still another group will cover "Club Work for Trade and Industrial Students."

Friday, Nov. 30

The Industrial Arts Section will hold a general and business meeting in the morning.

The T & I Section will hold four morning sessions devoted respectively to technical training, apprentice training, instructional aids, and graphic arts.

Shop Ticklers

In our shop we had one rule that whenever the teacher was talking to a visitor, no one was to interrupt for service, but was to stand at a respectful distance and wait. Once a potential

sixth-grade tornado had difficulty toeing the line so I nodded for him to come over. The work bore no resemblance whatever to his original outline, but before I could comment he looked up and beat me to it with, "It sure stinks, don't it?" Maybe the visitor has finished laughing now, but he surely was convulsed while he stayed.—*F. C. Finsterbach, Director of Education, Walker-Turner Division, Kearney & Trecker Corp.*

[Ed. Note: Readers are invited to contribute short humorous items, illustrated or not, from their teaching experience to this new department of School Shop.]

A Simple Shop Foundry

By Gordon Oldenburg and Ira H. Johnson

Foundry practice is a neglected area in industrial-arts curriculums, contend the authors. They show here how with small cost and limited space a good instructional program can be set up in the junior-high school. An appealing project—an anvil paperweight—is also described. Mr. Oldenburg is a student at State Teachers College, Mankato, Minnesota. Mr. Johnson is Assistant Professor of Industrial-Arts Education there.

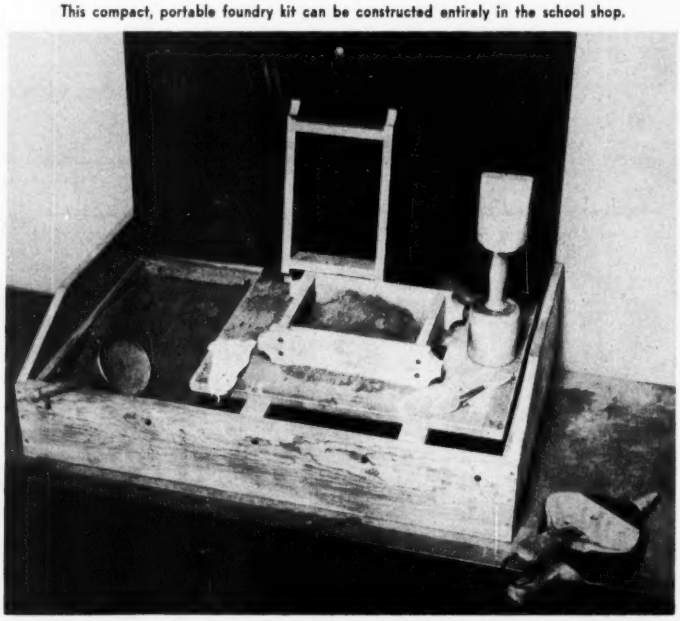
WE live in an industrial world, and many of the articles we purchase and use daily contain some part that originated in a foundry. It is, therefore, important that the junior-high-school pupil become acquainted with some foundry work. Small projects made by casting will stimulate his interest in industrial life and its problems, and give him an enriched understanding of the products he uses. Unfortunately, however, too few schools offer courses which enable students to become familiar with the processes and problems of pattern-making and casting. Much of this is probably due to the lack of space or available money to offer such a course in smaller school shops.

This article is an attempt to point out what can be done in a junior-high school with practically no expense, very limited space, and in any type of shop organization.

Most of the equipment can and perhaps should be constructed in the school shop. (See photo below.) The molding bench is constructed from ¾" pine or fir stock, and lined with galvanized iron for protection against moisture. The cope and drag (flask) can also be made from ¾" stock with angle iron used for clamps. A large strainer or discarded flour sifter serves very well as a riddle, or one can be made by tacking fine-mesh screen to a wooden frame. The rammer should be made from hardwood such as birch or maple, and may take various sizes and shapes. An old tablespoon may be used as a trowel or slick for smoothing or packing sand around the pattern. A piece of 1" brass tubing makes an excellent sprue cutter and a gate cutter can be made from scrap tin. A bellows and a furnace are usually standard shop equipment.

A good grade sand of fine texture and high silica content should be used. Enough sand (50 lbs.) and partine (non-silica parting compound) for a junior-high-school foundry unit may be pur-

This compact, portable foundry kit can be constructed entirely in the school shop.



Pattern-making and casting techniques can be taught well with this simple foundry project.

chased from a nearby foundry for little or nothing. Lead and aluminum work very well in a small foundry, and the students may bring scrap pieces for their own use. A suitable flux improves the quality and ease of casting.

Since the unit described is portable, it may be set on any workbench while being utilized, and stored while not in use.

Foundry work may be integrated in a general shop with drafting, woodwork, bench metal, and forging. This will serve to keep the cost and equipment at a minimum, and above all impress on the pupils the relationship of these various areas to the actual industrial process.

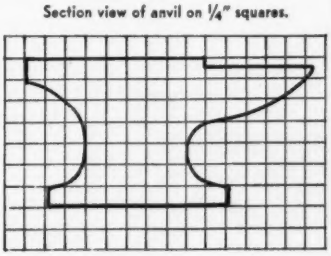
Various methods and techniques may be applied in teaching the foundry process. For example, it would be well worth the time to take a field trip to a nearby foundry. There the instructor and students could gather many useful "tips" and observe the procedures followed in industry. Mass production, various metals, latest equipment, labor problems, etc., could all be very valuable instructional helps.

A useful, well-designed project which has considerable student interest helps immeasurably in "selling" an instructional area to students. The small anvil paperweight pictured above has served very well in our junior-high school.

The pattern is easy to construct, the amount of metal used is small, and the finishing operations lend themselves to either hand or machine processes. We have had greater success with aluminum, but lead is also satisfactory.

The photo shows important foundry techniques: the sprue should be rather large (¾" to 1"), and close to the anvil proper with the connecting gate equally as large. Failure on either of these points will cause an unsatisfactory casting and undue localized shrinkage. Incidentally, we have tried casting the project with and without a riser. The results without a riser but with a large gate were as good as those with a riser, so it is omitted here.

Section view of anvil on ¼" squares.



Ease and accuracy of using metal marking gage is well shown in this closeup photo.

A Handy Marking Gage

By Joseph J. Costarella

Here is a mighty useful little metal shop tool for its size, and ease of manufacture. It teaches several basic procedures as well. Joseph J. Costarella is a metal shop teacher in Monrovia, Calif.

TESTED 55 PROJECT

THIS project finds constant use by the metal-shop student. It requires several manipulative skills, such as how to measure and lay out, at practically no cost at all. And it uses up small pieces of metal from 2"-3" in size lying around the shop.

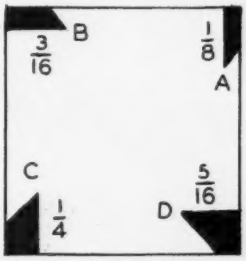
1. Materials required: 2"-3" pieces of galvanized iron, and some paint.

2. Tools needed: hammer, steel letters $\frac{3}{16}$" size, steel figures $\frac{3}{16}$" size, try square, T-bevel, tinsnips, rule, watercolor brush.

3. Equipment: squaring shears.

4. Procedure: Take a piece of sheet metal 18 or 20 gage, square to desired size, proceed as shown in drawing, and paint figures white with blue or black background for easy visibility.

Procedure in making gage: (1) Cut out a 2" square from #18 gage sheet metal; (2) Draw lines ½" long parallel to sides A, B, C, D as shown; (3) Lay out 45° angles at points A, B, C, D; and (4) Cut out shaded parts and stamp the correct figures.



How About Project Kits in Electricity?

By Carl F. Oberschmidt

The plan of project material kits described in this article is a controversial one. Not all teachers will agree that this system is the best from an educational standpoint. However, the author finds it excellent for expediting class manipulative activities. Following the discussion of method is a description of the motor for which the kit forms the basis. Carl F. Oberschmidt teaches at Withrow High School, Cincinnati, Ohio.

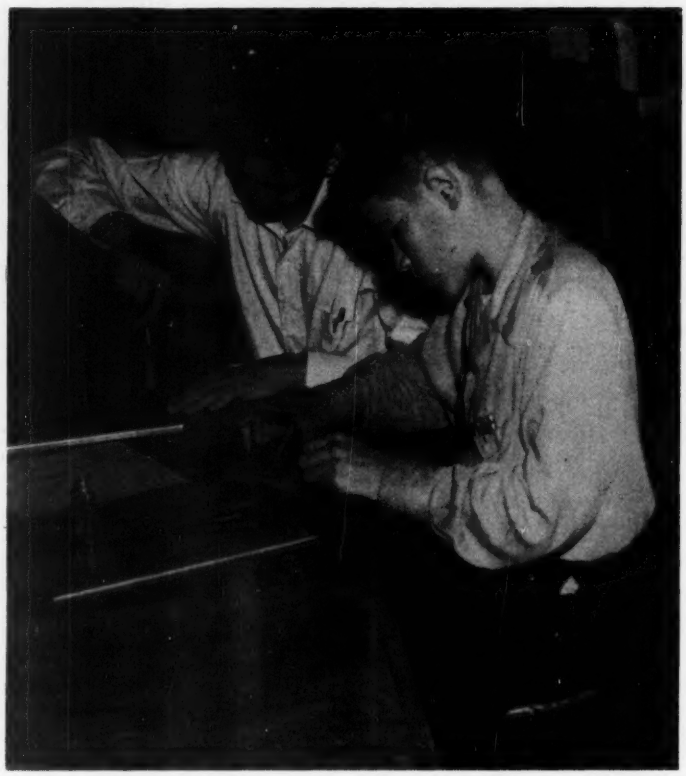
SEVERAL years' experience with project material kits, prepared in advance by student helpers in the electrical shop, has convinced me this system has many advantages both to the student and the instructor.*

The student can start manipulative work at any time without delay, and he has more time for actual construction so he can give greater attention to the electrical phase of the project. He is made responsible for all of his project parts at once, and if he spoils one he must pay for it. Consequently he is more exact about measurements and tool operations, and takes better care of the materials. There is no need for him to loaf while waiting for project materials. Students like this system because they can produce a higher grade product.

The instructor has more time for supervision and individual help, since he does not have to keep individual records of the many small parts required for a given project. He can keep his operating costs at a minimum because of the insignificant waste under this system.

*For a different point of view see the article, "Selection of Electricity Projects Is Important in Industrial Arts," by T. Glade Wilcox, SCHOOL SHOP, X:4 (December, 1950), 14-15.

Open project kit drawer showing complete parts for two-pole motor—first ninth grade assignment



Students assembling simple two-pole motor from project material kit parts.

Students need not have daily access to reserve stock, the shop is not cluttered up with long pieces of material, and a stock keeper is not needed. However, students do not lose the valuable experience of preparing material, because all project stock is cut sufficiently oversize to require the same operations of measuring, sawing, grinding, filing, etc., as under conventional methods.

Some project parts which cannot be made economically by individual students are produced by a few boys on a mass-production basis. Wherever possible, however, every student is afforded this experience in order to give him an idea of modern shop production methods in industry.

Students are encouraged to design and construct time- and labor-saving devices for sawing, drilling, etc., in order to produce certain parts more accurately.

How the Kit System Works

Each student has a drawer assigned to him, with the same number as his seat, in a metal cabinet in the shop. All of the required projects are accommodated in the drawers, which are numbered alternately in horizontal rows so that all students can attend their drawers at once without interference.

A different color for each class is used for the number cards on the drawers, eliminating any excuse for the student getting into the wrong drawer. As an added precaution, each one prints his name, homeroom number, seat, and drawer number on a 3″x5″ card which is kept in the drawer. A sheet of rules and suggestions on the use of project drawers is given to each student. To guard against a student losing his work, all parts where possible must contain the owner's name so that they can be returned to him if lost or accidentally left out of the drawer.

Students are not allowed to take any of their materials or projects home, or to their clothes lockers, until the finished article is graded and paid for. Finished projects minus the owner's name are not accepted for a grade. Before this plan was put into effect, students often were

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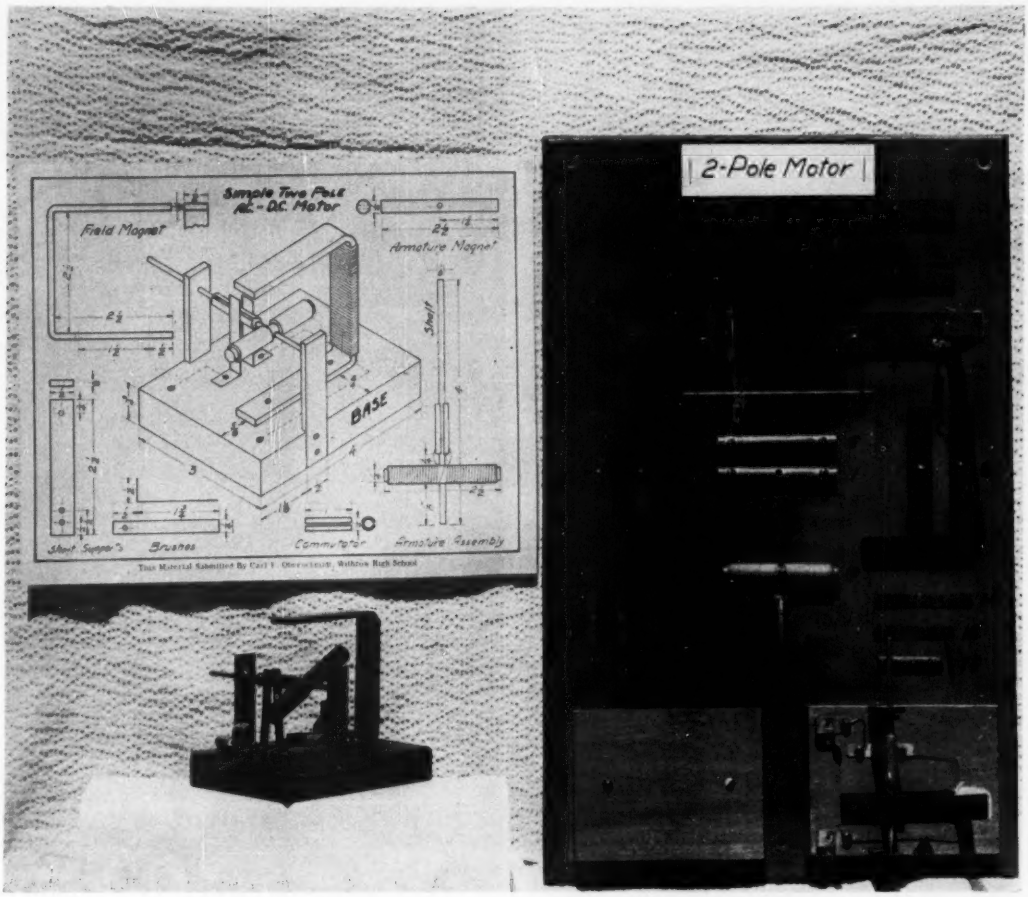

"relieved" of their finished work by those who either lost or spoiled theirs.

Project materials are prepared long in advance by students either as fill-in work during regular class time, or as detention assignments. At the beginning of the year, and at other times when new required projects are undertaken, the needed materials are placed in the drawers by student helpers. Each student also receives one piece each of medium-grain and fine-grain sandpaper, and 12½" #4 round-head blue wood screws.

This method is ideal for distributing the small supplies needed for most electrical projects and likewise an excellent way for the student to take care of them.

A Simple Two-Pole Motor

This motor has proven popular with beginners in electricity because it is easy to make, operates on either ac or dc, and can be used to drive small toys. In spite of its simplicity, it involves practically all of the parts of a commercial motor and, therefore, serves as an excellent means for teaching the fundamentals of motor operation and construction.

As it really runs, the boy derives an immense amount of pleasure from seeing how the motor performs on both kinds of current, the effect of shifting the commutator on the shaft, and the reversing of the direction of the armature by means of a d.p.d.t. switch or by simply interchanging either the field or armature leads.

The following materials are needed:

One piece of ⅛" x ½" strap iron, 7½" long.
Two pieces of ⅛" x ½" strap iron, 2½" long.
One piece of ¼"d crs, 2½" long.
One piece of ⅛"d crs, 4" long.
Two pieces of spring brass ¼" x 2½", #28 gage.
One piece of 3/16" id brass tubing, 22 gage, 1" long.
One poplar or other soft-wood base, ¾" x 3" x 4".
Eight ½" #4 rh wood screws.

When making the field magnet, apply two pieces of friction tape 2¼" long to the edges of the center section. Allowing 4" leads and starting at the bottom, carefully and tightly wind on two layers of #22 B&S gage magnet wire.

The armature magnet is made by carefully winding two layers of #22 B&S gage magnet wire on the armature core, beginning and ending in the center. Allow 3" leads and be sure to wind in the same direction when changing over from one side of the shaft to the other.

The commutator is made by sawing the $\frac{3}{16}$" brass tubing in half lengthwise. A 1" strip of paper is glued on the shaft for insulation. The tubing is then cemented to the paper. The armature leads are soldered to the commutator segments, one lead to each segment.

When assembling, solder a washer on the commutator end of the armature shaft to take out end play.

Connections are made as follows for series: (1) Connect one field magnet lead to one of the brush terminals. (2)

(*Continued on page* 26)

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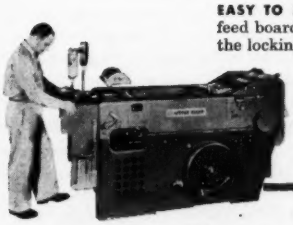

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Abrasive comments from that doughty Scot, Tom Diamond, former head, Department of Vocational Education, University of Michigan, Ann Arbor.

A Laugh—Now and Then

AS one travels from school to school and observes the activities going on as he moves about, the traveller is apt to conclude that all of the humor in the universe is not confined to the weekly supplement to the Sunday paper.

As an illustration, we might mention the boy in the industrial-arts shop who appeared to be having difficulty in sawing the end off a board. He had the board lying across his bench and was attacking his problem with all the enthusiasm that a boy who is interested in his work can muster. The fact that the energy he was expending seemed to be out of all proportion to the thickness of the board caused us to move a little closer to observe the reason. No doubt you have guessed it. Yes! While sawing across the board he had sawed two-thirds of the way through a 2¼" maple bench top.

However, don't let anyone tell you that the pupils are the only ones who contribute to the humorous side of industrial arts. It has been found that teachers, too, occasionally add their quota of amusing incidents.

This is illustrated by the case of the teacher who was greatly perturbed because the firm from whom he obtained his supplies had sent him a left-handed bandsaw blade. He was holding forth with considerable volubility on the "dumb cluck" who was responsible for the error. How did that—gentleman—think anyone could do effective work on a band saw when the teeth were pointing upwards. We will pause for a moment at this point while you consider the chagrin of the teacher when a kindly soul suggested that it might be helpful if he flipped the saw around so that the inside surface was brought to the outside.

Then there was the case of the teacher who received a new motor for one of his machines. When it arrived he promptly placed it in position and connected it to the source of power. He was proud of the result, until he pulled the switch and found that the machine was running in reverse. Of course the supply house was at fault; they had not followed the specifications. The motor was a right-hand drive instead of a left. However, while the teacher was in the office lodging a complaint, the supervisor, who had a sense of humor, reversed the leads, which rectified the situation. As far as we know the teacher is still wondering what happened.

The supervisor, too, has moments when he causes a slight ripple of amusement, usually when he is not present. One supervisor, who was meticulous in everything he did and to whom only expensive equipment was suitable for his department, had a feeling that one of his teachers needed a lock on the new office which had just been erected in his shop. With this in mind he authorized the teacher to procure and install a suitable lock. When the lock was delivered, the supervisor complained that it was not good enough for such a nice new office, so he took it on himself to exchange it for one which he felt was more fitting. In due course he returned with a beautiful and expensive Yale lock.

A short time after the lock was installed Mr. Supervisor visited the shop and, during his visit, he had occasion to ask the teacher for an outline which he had asked him to prepare. The teacher had completed the task, but the outline was on his desk. His keys were there also and the door was locked. Naturally the teacher was distressed and, as he and the supervisor were contemplating

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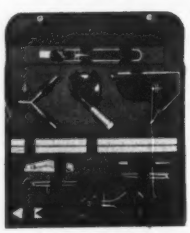

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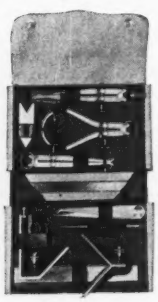

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breaking the glass in the door, a grubby looking youngster ventured to inquire if they wanted the door opened. When they assured him that they did, the boy took a piece of wire, pressed the catch back, and in less than a minute the door was open.

It is not too difficult to imagine the annoyance of the supervisor when he found that even a $15 lock is vulnerable when the door opens out into the shop.

Most school people have had similar incidents brought to their attention, so who is there who will contend that the field of industrial education is entirely devoid of humor?

1951 Ford IA Awards

The 1951 Industrial Arts Awards contest sponsored by the Ford Motor Co. drew 2400 entries from 40 states, the District of Columbia, and the Territory of Hawaii. National winners' exhibits were on display in the Chicago Museum of Science and Industry from August 17 through October 14. Nearly 1000 students won cash awards ranging from $10 to $100.

The nine Outstanding Achievement Award winners, together with their instructors, received a three-day, all-expense trip to Dearborn, Michigan, September 27-30, which included the award banquet and seats at the University of Michigan-Michigan State football game.

Top winners, and their instructors:

Patternmaking and Molding, Robert Sloan and William Beifuss, West Technical H. S., Cleveland, Ohio; **Plastics,** Richard C. Bueler and Eugene Steidemann, Roosevelt H. S., St. Louis, Mo.; **Architectural Drawing,** Robert L. Lockwood and John Zinngrabe, Fenger H. S., Chicago, Ill.; **Printing,** Dion M. Markle and Richard E. Giebel, Cass Technical H. S., Detroit, Mich.; **Wrought Metal,** Bob Thompson and Lewis B. Rosenberg, University H. S., Los Angeles, Calif.; **Machine Shop,** Bill Capeder and David Geske, St. Paul, Minn., Vocational School; **Wood,** George M. Veiga and Fred A. Marcellus, Hanford, Calif., Union H. S.; **Electrical,** David Sauerwald and Don C. Brockway, Dorsey H. S., Los Angeles, Calif.; and **Mechanical Drawing,** Kenneth Weinhold and Frank Kidd, Edison Vocational H. S., Baltimore, Md.

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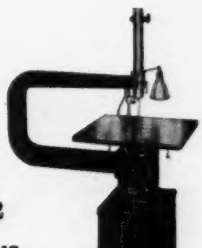

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You may submit an entry in any one or all of the six divisions.

CONTEST INSTRUCTIONS

a. **All entries are to be submitted on the official Delta Shop Floor Plans.**

b. **The true location of windows and doors must be indicated, as well as lumber and material storage area and tool room area. It is not necessary for such storage areas themselves to appear on the plan, but entrances to them must be clearly shown.**

c. **Entries may be submitted in as many divisions as desired, but each entry must be on a separate official floor plan, and must indicate clearly the division for which it is intended. In each case, the type of shop should be described (wood, metal, general, etc.).**

d. **A supplementary description must be submitted explaining why the various arrangements are made. In cases of similar layouts, this description will be the deciding factor in judging.**

e. **Supplementary drawings may be submitted showing bench design, cabinet types, tool panels, etc., only if they are sufficiently individual to influence better shop performance.**

f. **The layout should allow for an anticipated 25% to 30% expansion in student requirements. The shop of "today" should be shown on your floor plan No. 1; the "future" part of the shop should be clearly indicated on your floor plan No. 2.**

g. **Contestants must indicate whether or not the plan is original or existing (if it is an existing shop, it must have been designed by the entrant).**

CONTEST RULES

a. **Contest starts November 1, 1951.**

b. **The contest closes at midnight, July 31, 1952.**

c. **Prizes will be awarded concurrently with the AVA convention in Boston, November, 1952.**

d. **All entries become the property of the Delta Power Tool Division, Rockwell Mfg. Co., Milwaukee, Wisconsin.**

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- read Contest Instructions
- read Contest Rules
- mail the coupon

—and you'll receive your official Entry Form and floor plans.

Who is eligible?

This contest is open to school men engaged in instruction, supervision or administration of Industrial Arts, Industrial and Vocational Education, and to graduate and under-graduate students at accredited teacher training colleges.

Not eligible are all persons employed by or in any way identified with the Rockwell Manufacturing Company — its divisions, its dealers and distributors, its advertising agencies, including all members of their families.

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Please send me the Delta Official Entry kit for the Delta School Shop Layout Contest

Name_____ Position_____

School_____ Address_____

City_____ Zone____ State_____

School Shop KINKS

Payment will be made for each Kink published. Send to Editor, School Shop, Ann Arbor, Mich.

Molds for Slip Casting

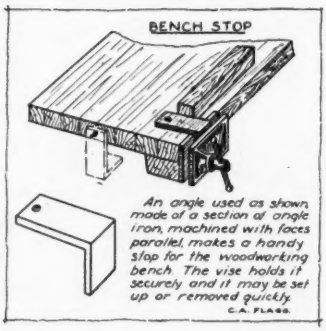
Erecting walls around objects to pour a plaster mold for slip casting has always been a messy and costly job. The conventional sheet-metal, linoleum, or plywood walls were always the wrong size or mislaid; clay used to seal the joints was ruined after one or two pourings; and leaks were all too common.

These faults have now easily been overcome, for the two-piece mold, by using candy cartons from the school cafeteria. With a sufficient supply, it is easy to select a suitable size for practically any object the student wants a mold of.

The object is prepared as for conventional pouring, with a cylinder of clay running from it to what will be the edge of the mold, so as to provide a gate for pouring the slip. The plaster is then poured into the bottom of the candy box, and the object is imbedded to its parting line. After the plaster has set, the usual lock or joggle holes are gouged out, and the parting substance (slip, soap, etc.) is applied. To pour the upper half of the mold, merely slip the top of the candy box over the bottom half so as to have a ½" overlap. This position can be maintained and the joints sealed by the use of masking, scotch, or adhesive tape. A hole about 2" square, cut in the top of the box, then enables the second half of the mold to be poured. The cardboard can be thrown away when the plaster has set.—*David E. Wilson, Haddon Heights, N. J., High School.*

Handy Bench Stop

The sketch below for this kink is self-explanatory. The angle stop might be


BENCH STOP
An angle used as shown, made of a section of angle iron, machined with faces parallel, makes a handy stop for the woodworking bench. The vise holds it securely and it may be set up or removed quickly.
C.A. FLAGG

made of wood to prevent damage to plane irons.—*C. A. Flagg, Virginia Junior College, Virginia, Minn.*

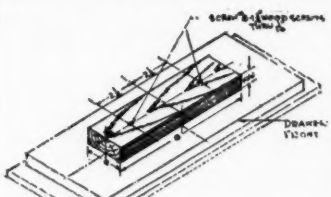
Clean Paint Brushes

In my shop I found that many times shellac brushes had been dipped in turpentine, paint brushes improperly cleaned, etc., so I had to keep a watchful eye on students using brushes.

My solution was to stamp on each brush handle a large *P* for paints, *V* for varnish, and *S* for shellac. Then on the wall in the paint room I pinned a sheet of paper designating the solvents to be used to clean each kind of brush. This saves guessing by the student, and much time and trouble for the instructor.—*Fred Lentini, Middle Township High School, Cape May Court House, N. J.*

Drawer Handle Jig

The sketch below illustrates the jig I use for marking holes for wood handles



on drawers.—*N. M. Pittman, Leveretts Chapel High School, Overton, Tex.*

By whatever standards you measure a lathe—bearings[1], capacity[2], gearing[3], apron[4], bed[5], power to spindle[6], accuracy[7]—whatever is important to *you*, you will find it completely satisfied in a SHELDON lathe.

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IN THE Morning Mail . .

[Brief comments about SCHOOL SHOP and the field it serves are invited. Address the Editor, SCHOOL SHOP, Ann Arbor, Michigan.

Dear Sir:

. . . Your second editorial (September issue) is timely and the subject is critical. The supervisors and directors . . . participate in these regional meetings, but the teachers have been denied the privilege.

You know that I am as interested in the welfare of the teachers as any one can be, but here is the problem: Picture if you will, five teachers in a big high school, each handling from 150 to 200 pupils per day. In a school of 1500 to 2000 what becomes of these pupils when the teachers are excused to attend a meeting? We have discussed this with the principals and superintendent. Pupils cannot be excused from school—we have no substitutes for industrial arts—if we have a substitute to take them to study hall it costs $15 per day for each substitute, and the pupils object very strenuously. We have 200 teachers in the Vocational and Practical Arts Departments. If they were excused I am afraid the school system would fall apart.

We do, however, excuse a representative from each high school and the other teachers double up and take care of the classes with the showing of an industrial arts film. . .

V. L. Pickens, Chairman,
Division of Practical Arts, Vocational and Family Life Education, Public Schools of Kansas City, Mo.

Editor's Note: It is gratifying to learn that Kansas City schools do have a working plan for permitting some of its instructors to attend meetings in their field. To our knowledge this puts them in a rather unique position in this respect.

Dear Sir:

Conventions of all kinds are an established and accepted phenomenon . . . Such activities call for much labor, disruption, and financial investment. It is entirely legitimate, therefore, to ask whether these expenditures are warranted. . .

The first consideration is that the program be informative and stimulating to as many as possible of the convention goers . . . exhibitors stimulate interest in equipment and materials of instruction . . . national or regional policies of large groups can be agreed on. The personal contacts and psychological effects of the convention atmosphere equal, or often surpass in value the formal program itself . . . exchange of ideas with others having similar professional interests and problems . . . fostering the *esprit de corps*. . . The return to one's work is usually undertaken with a reservoir of enthusiasm, assurance, and vitality. . .

If all or some of these benefits can be expected from conventions, then who should attend? It usually is impractical for the entire professional staff to go. . . The great bulk of educators attending conventions are, of course, administrative officials. . . Even if they report very accurately and conscientiously to their faculties, the fare is rewarmed and devoid of practically all the psychological values. Depending, of course, on the nature of the convention, a much higher proportion of the individuals attending should be classroom teachers. Teachers can hardly develop vision and professional zeal if they are kept confined in their classrooms. The nature of their work tends to restrict their horizons more than it does to administrators. . .

Teachers can be chosen on a basis of how the convention program meets special interests or needs, the stated interest of certain teachers to attend, selection by their fellow faculty members, recommendation by administration, or other means. . . It is well, over a period of years, to have as large a proportion of the faculty share in the experience as possible. The teacher should not suffer loss of salary, and reasonable convention expense monies ought to be provided . . . also . . . much would be gained by including more of the classroom teachers in many phases of convention effort.

Benjamin J. Novak, Dobbins Vocational-Technical School;
Lecturer in Vocational Education, Temple University, Philadelphia, Penna.

Dear Sir:

. . . I believe that you put out the best magazine of its kind. . . . I read your magazine from cover to cover. Please I beg of you, keep (it) as good as it is now. The only thing I find wrong is that it isn't big enough. Your projects are real up to date. . . . Thanks a million for everything.

R. W. Proulx,
Industrial Arts Instructor
Dexter School, Brookline, Mass.

Dear Mr. Diamond:

Your story—Black or White?—on page 2 of the March issue of SCHOOL SHOP—hits at least one nail—right on the head.

Although I have used various versions of such stories in the past, you seem to have "buttoned it down" most appropriately. . . .

Harry Lewis, Curriculum Coordinator,
Vocational High Schools, New York City.

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All-Purpose Food Slicer

By D. F. Heineman

An unusual number of processes in elementary woodwork are involved in this simple project. D. F. Heineman submitted this while a student at Western Michigan College of Education, Kalamazoo.

Bread, sausage, meat loaf, or cheese can be cut into neat, equal slices with this gadget.

TESTED PROJECT

THE interest and enthusiasm of beginning woodwork students can be caught and held by this practical adaptation of the old-fashioned breadboard. A demonstration of this well-designed slicer in action will give the young student the zeal to start and finish one for himself.

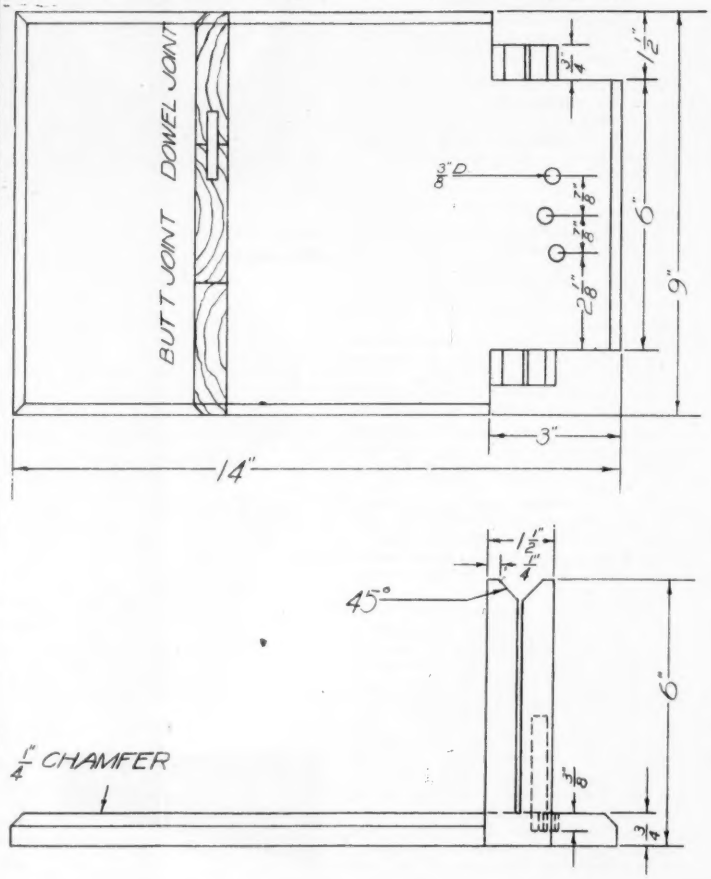
It is easily adaptable to other foods, such as sausage, meat loaf, cheese, and others, and so makes an excellent take-home project.

Holes are drilled between the uprights which guide the knife. A loose dowel is placed in the hole to serve as a stop for the food being cut. The thickness of the cut depends on the placement of the holes.

The uprights for guiding the knife are held in place by wood screws.

A goodly number of educational principles can be worked into this problem.

(Continued on page 26)



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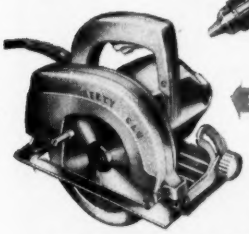
high speed for precision work. Four models from ⅓ to 2 h.p. No. 28 shown, ½ h.p.

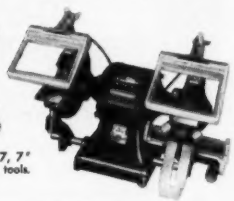
available in 23 models in capacities to 1¾". No. 24 shown, ¼" capacity.

DRILLS



SAWS

four sizes, 6", 7", 8", and 9". Many exclusive features. No. W63 shown, 6" blade.



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six models in sizes to 10". No. 677, 7" wheels, shown. Ideal for sharpening tools.

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Slicer . . . . . *from page 24*

such as the fundamentals of fasteners, joints, bevels, chamfers, gluing, sawing, layout, and chiseling.

Modifications can be made by the instructor to improve on the slicer pictured here. For instance, strips of wood can be fastened to the board to form rails to hold the loaf of bread or other article in place while it is being cut or the uprights that guide the knife could be made out of metal.

Electric Motor . *from page 16*

Connect the other field magnet lead to one of the Fahnestock clips. (3) Connect a wire from the terminal of the second brush to the remaining Fahnestock clip.

For parallel: (1) Connect both field magnet leads to the brush terminals. (2) Connect one wire from each of the brush terminal screws to the Fahnestock clips.

Following are some questions to stimulate pupil understanding:

1. On what important principle is the operation of the motor dependent?
2. What determines the direction of rotation of the armature?
3. Why must both halves of the armature coil be wound in the same direction?
4. Why must the commutator consist of two separate parts, insulated from each other?
5. Can the motor be reversed while the field and armature magnet coils are connected in series?
6. Can this motor be made to perform as a simple generator?
7. Would this motor run if a permanent magnet was substituted for the wound field magnet?
8. Why should hard steel not be used for the motor magnet cores?

Following are several student activities and suggestions:

1. After your motor has been run for a while, disconnect the field magnet and see if you can get the motor to run without it. If it runs, can you explain why?
2. Connect the motor to an a-c galvanometer. Spin the shaft and see what happens.
3. Try various hookups to discover how your motor can be reversed.
4. Connect the field and armature magnets first in series and then in parallel and observe the results of each.
5. Connect motor to a 6-v ac and a 6-v dc source to see the difference in operation on both kinds of current.
6. If time permits, construct a double-pole, double-throw or any other type of reversing switch and connect it up to your motor so you can change its direction of rotation conveniently.
7. If your motor is a good one it should run on a single dry cell.

Each student is given a three-page mimeographed description of how a simple motor works for reference purposes. This discusses polarity, magnetism, how the armature and commutator work, and reversing.

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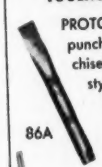
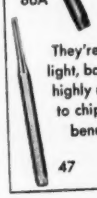


They're strong, light, balanced, highly resistant to chipping or bending.

47



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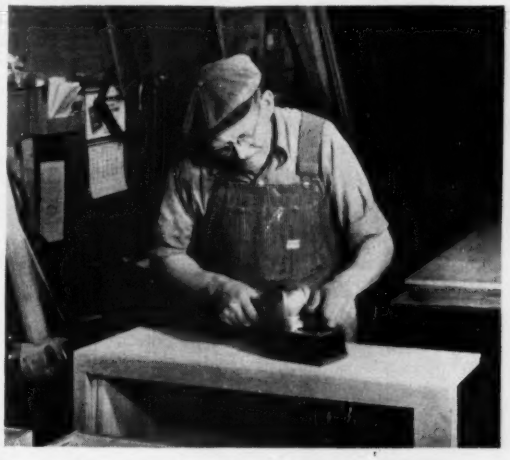

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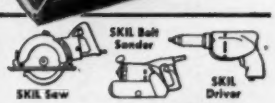

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Enclosed Bulletin Board

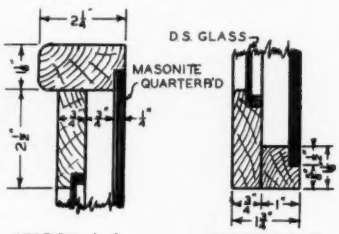
By GEORGE SHALKHAUSER

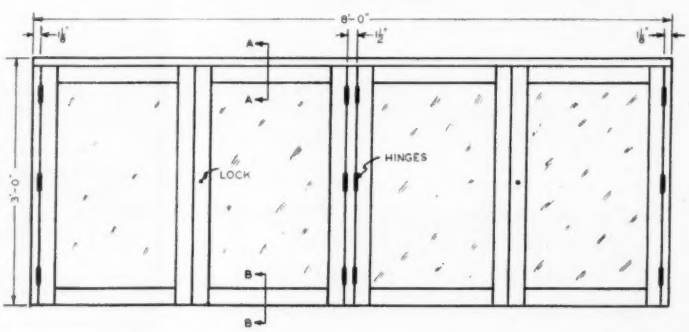
Uncovered school bulletin boards quickly become disordered, defaced, and unsightly. School officials will welcome this handsome solution to the problem. It makes a good cooperative class project. G. Shalkhauser is an instructor in the El Paso, Texas, Technical Institute.

AN excellent project which will benefit the whole school and gain friends for the woodworking department is this enclosed bulletin board. Its glass-covered, hinged doors can be locked for safe display of school pictures, awards, certificates, and other valuable material. Defaced or otherwise mutilated displays on the bulletin board will become a thing of the past with this useful and decorative project completed. The size may, of course, be varied to suit local conditions. Here is a good group project which your class will want to make.

To hold the doors closed on which the locks catch, use some type of positive door catch or bolt top and bottom. Locks on the cabinet shown were fitted to the right-hand doors. General construction details are shown on the drawing. Finish the framework to match other woodwork adjoining.

The depth of the case can be varied to meet the needs of the situation. In some instances regular display shelves could be installed if the case is to be used for project or other display purposes. The addition of a lighting unit is desirable in such instances.





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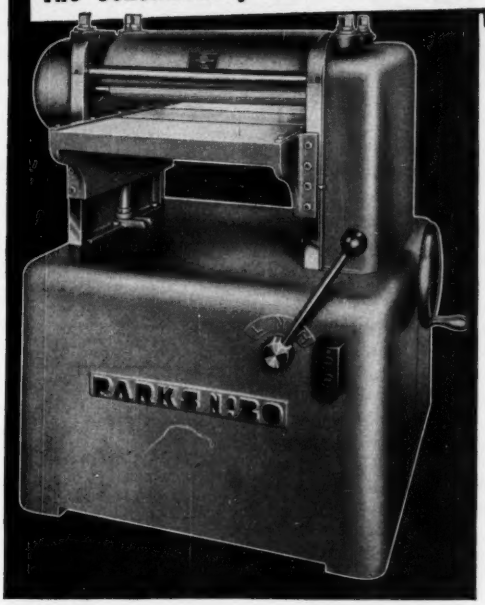

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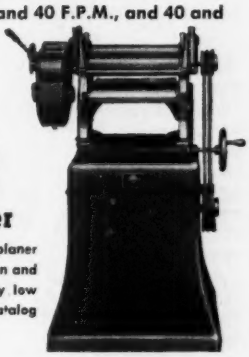
Here is a modernly designed, rugged, high-speed, low-priced planer that is ideally suited for every shop and industrial plant requiring a quality surfacer. The Parks No. 20 Planer has a four-knife cutterhead with a speed of 3600 R.P.M. and offers two feed speeds—20 and 40 F.P.M., and 40 and 80 F.P.M. Write for complete descriptive literature.



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Ball bearing equipped . . . with *more new improvements* than any other saw in its price class!

INCREASED CAPACITY is a big *plus* feature of this new saw. Cast iron table is 32" x 25" with extensions . . . there is a full 10¼" ahead of the blade. You can make cuts up to 3¼" in thickness at 90°. Maximum distance from blade to fence is 15¾". Does dadoing up to 13/16" wide, with a 6" dado set. Also does sanding with 8" diameter disc.

MAXIMUM SAFETY is assured by newly designed rip fence which has a new "T" type safety guide bar . . . new cast blade guard which allows operator to see his work in safety . . . new lock-type switch prevents unauthorized operation of saw.

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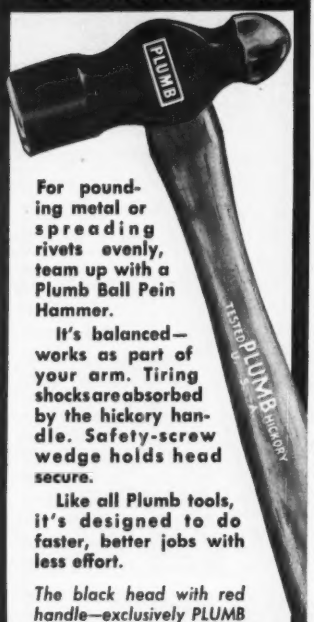

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ABOUT YOUR FELLOW TEACHERS

DEWEY BARICH has resigned as head of the Industrial Arts Department at Kent State University, Ohio, to become head of the Ford Industrial Arts Award Program, Dearborn, Mich. . . . KENNETH R. BURCHARD, former manager of offset and photomechanical sales, American Type Founders, is now professor and head of the Department of Printing Management, Carnegie Institute of Technology . . . HENRY BERRING, long associated with Weston Electrical Instrument Corp., has been appointed educational director . . . CHESTER L. MESSMORE has resigned his position as manager of the School Division, International Textbook Co. . . . HOWARD E. ZIEFLE, supervisor of vocational-industrial education in Baltimore public schools since 1943, has been appointed principal of the Edison Vocational High School, replacing MILLARD C. KENT, retired. Mr. Ziefle will also serve as coordinator of the programs of Edison, Barton, and Mergenthaler Vocational High Schools in preparation for the opening of the new Mergenthaler Vocational-Technical High School, when he will serve as principal of that school . . . WILLIAM J. HUCKSOLL, principal of Wilson General Vocational School in Baltimore, has been appointed supervisor of vocational-industrial education . . . A. JOSEPH PUMPHREY has been appointed principal of the Wilson School . . . CLAY KNIGHT, coordinator of vocational industrial education at Union Springs and Piedmont, Ala., was recently appointed director of the new state trade school at Mobile . . . B. G. MANTEL, VIE assistant state supervisor in Alabama, has been ordered to active duty with the Air Force at Wright Field, Dayton, Ohio, to train Air Force personnel there . . . ELDRIDGE R. PLOWDEN, chairman of the Vocational Department, University of Alabama, is on leave to serve as technical director of the Institute of Inter-American Affairs, Rio de Janeiro, Brazil . . . ROBERT O. SMALL, former state director of vocational education in Massachusetts, died August 5 . . . JERRY R. HAWKE, executive assistant, Vocational Education Division, U. S. Office of Education, died August 28 . . . CLARENCE E. RAKESTRAW, consultant in employee-employer relations, Trade and Industrial Education Service, U.S.O.E., died August 29 . . . RALPH J. KEEN, director of the Beloit, Wis., Vocational School for the last six years, died August 6 . . . EMELUS G. WORTMAN, printing instructor, Abington, Penna., Senior High School, for the last 24 years, retired last June . . . CLEVE LOMAN of Roanoke, Va., recently joined the staff of the Virginia State Trade and Industrial Service. He has been developing a training program for veterans . . . ARTHUR L. REAGH, director of vocational education and industrial arts for Grand Rapids, Mich., has retired . . . BERNARD J. KENNEDY, mechanical drawing instructor at Ottawa Hills H. S. there, has succeeded him . . . W. R. SUMMERVILLE, industrial education supervisor in the Ridgway, Penna., public schools, retired after 38 years of teaching and supervision . . . LYLE J. SHAW is now director of Catherine Boniface Technical School, Escanaba, Mich. . . . HENRY A. WHITE is the new head of the industrial-arts and vocational-education department at New Mexico Western College, Silver City . . . ELLSWORTH M. RUSSELL is assistant professor of industrial arts at State Teachers College, Buffalo, N. Y. . . . ANDREW EATON, a graduate of Northwestern State College, Natchitoches, La., and a major in vocational-industrial education, has been appointed assistant supervisor of trade and industrial education for Louisiana. S. W. JACKSON, another recent graduate, has been appointed director of the Ouachita Valley Vocational School at West Monroe, La. FORD HAYS, also of that school, is now director of the Curriculum Laboratory for Trade and Industrial Education in Louisiana.

News

HAPPENINGS IN INDUSTRIAL EDUCATION

Kansas Meetings

THE Kansas Vocational Association luncheon, Kansas Coordinators Association meeting, and Kansas Industrial Education Association meeting will be held in Wichita in connection with the Kansas State Teachers Association Convention November 1-2.

Dr. Bernice Moore, consultant, Homemaking Education Service, Texas Education Agency, and the Hogg Foundation of Mental Hygiene, Austin, will speak at the KVA luncheon at noon, November 2.

May Honored

WALTER M. MAY, state director of vocational education in New Hampshire, was honored at a dinner attended by 400 persons June 5 in Concord, on the completion of 46 years of service. Dr. M. Norcross Stratton, Massachusetts state director of vocational education, was guest speaker.

State VA Meetings

MEMBERS of the Washington Vocational Association heard Frederick Baker, nationally known industrial and public-relations consultant, at their sixth annual convention in Bellingham, August 23-24. The talk was planned as part of a campaign to improve public relations in vocational education. WVA President J. Alan Duncan strongly urged that other states adopt a similar program.

"Meeting Today's Obligations for Tomorrow's Opportunities" was the theme of the Pennsylvania Vocational Association's annual conference held in Eagles Mere June 20-22. Dr. Paul L. Cressman, state director of vocational education, was chairman of the general session, and Dr. L. H. Dennis, consultant in vocational education and former executive secretary of the AVA, spoke.

The Colorado Vocational Association held its fourth annual Get-Together in Colorado Springs June 13-15.

The fifteenth annual convention of the Wisconsin Association for Vocational and Adult Education was held in Milwaukee's Schroeder Hotel May 2-5. J. Donald Phillips, assistant director, Continuing Education Service, Michigan State College; Paul S. Weaver, dean of religious life, Stephens College; C. L. Greiber, Wisconsin state director of vocational and adult education; and M. D. Mobley, executive secretary, AVA, addressed the meeting.

Mrs. T. A. Kitchens of Atlanta is the new president of the Georgia Vocational Association . . . Leon Osinski, coordinator for veterans training, Brown Vocational H. S., was elected president of the Delaware Vocational Association . . . Dill D. Beckman of Columbia was recently elected president of the South Carolina Vocational Association.

OSU Epsilon Pi Tau

SEVEN men were initiated into Alpha Chapter of Epsilon Pi Tau at the twenty-second annual banquet and forum held at the Faculty Club, Ohio State University, July 28. Harold G. Gilbert, State Teachers College, Oswego, N. Y., was toastmaster. The speakers were Hilles G. Kemp, director of civil defense at Belmont, Ohio, H. S.; Louis J. Callan, State Teachers College, Buffalo, N. Y.; Kenneth W. Brown, assistant director of industrial arts, Philadelphia public schools; William E. Warner, trustee of the chapter; and George C. Beery, past president, Ohio Education Association.

IE Supervisors

H. J. SHUFELT of Racine, Wis., presided at the third annual Industrial Educators' Supervisory Conference at Bradley University, Peoria, Ill., August 9-11. Edward M. Claude, chief of trades and industries, State Board for Vocational Education, Springfield, Ill., discussed the emergency training program. Glenn Fletcher, director of industrial education, Houston, Tex., spoke on implementing industrial programs. Arthur L. Reagh, retiring director of industrial arts and vocational education, Grand Rapids, Mich., discussed the industrial education curriculum. Dr. Wayne P. Hughes of the National Safety Council spoke on supervisors' responsibilities for school safety.

New Ship Officers

THE recent mail ballot of The Ship reveals the following new officers elected: Captain, Clyde Clack of Binney & Smith; First Mate, Todd Jones of SCHOOL SHOP; Log Officer, Bob Stucker of Brodhead-Garrett; Purser, Bill Jennison of *School Arts;* and Radio Officer, Harry Masters of L. S. Starrett.

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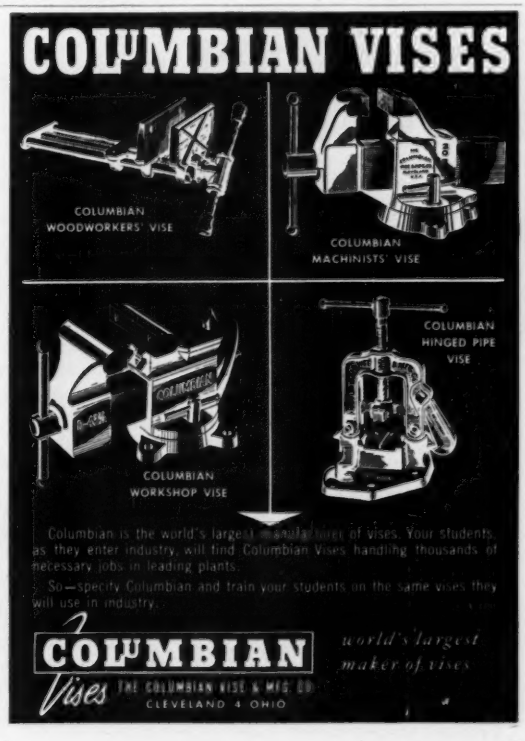
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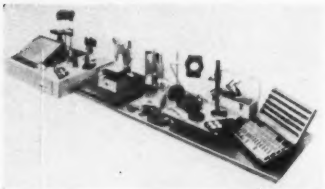
News from INDUSTRY

"Limited Budget Laboratory"



George Scherr Co., New York, has just put on the market an economy set of measuring tools and instruments for inspection purposes. The assortment, pictured above, can be used to measure and inspect thickness, length, diameters, forms of tools, templets and dies, pitch, lead, and form of screw threads, visual inspection of finish, circular divisions and graduations, etc. Tools may be purchased separately.

Further information on any of the eight items in the set will be supplied by George Scherr Co., Inc., 200 Lafayette St., New York 12, N.Y. (mention SCHOOL SHOP); *or check no. 10 on the coupon.*

1952 Radio-TV Catalog

Concord Radio Corp., Chicago, has just issued its new buying guide for 1952, Catalog 95, listing radio, TV, and electronic parts and equipment. Included are Hi-Fi components and ensembles, TV and radio equipment, sound systems, ham gear, test equipment, electronic tubes, parts, tools, books, kits, etc. The technical advisory service is also described. For a free copy, write Concord Radio Corp., 901 W. Jackson Blvd., Chicago 7, Ill., mentioning SCHOOL SHOP; *or check no. 11 on the coupon.*

Columbian Vise Buys Level Co.

Purchase of The E. A. Stevens Level Co., Newton Falls, Ohio, has been announced by The Columbian Vise & Mfg. Co., Cleveland.

Each item listed above is numbered. Check the numbers of the items you want, and mail the coupon, properly filled in, to . . .

School Shop
Ann Arbor, Michigan

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school .....
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subject(s) taught 11-1

New Heavy Duty Sander

Porter-Cable's newest Guild Sander, Model 106, priced at $49.50, has a simple, gearless design, and is powered by a heavy-duty Universal motor. Useful and safe for training and project work in school shops, it is rugged enough for year-round use on school maintenance jobs such as resurfacing desks, chairs, and blackboards. It weighs only six pounds; and is 9½" long, 4⅛" wide, and 6½" high. For further information, write Porter-Cable Machine Co., Dept. PR-1, Syracuse, N.Y., mentioning SCHOOL SHOP; *or check no. 12 on the coupon.*

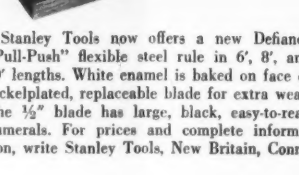
Non-Slip Floor Covering

Fera-Mat is a new product designed to prevent serious slipping accidents in factories and shops, especially where extra hazard exists. The walking surface is composed of durable mineral granules, resin-bonded to a heavy-duty weatherproof cloth backing. It is available in 6" x 24" cleats, black, red, or green; or in 6" x 96' rolls, black only. For additional information write to American Abrasive Metals Co., 460 Coit St., Irvington, N. J., mentioning SCHOOL SHOP; *or check no. 13 on the coupon.*

Protractor Tee Square

This unique instrument is the newest drafting device invented by O. A. Olson of the engineering department at Iowa State College, Ames. Its head is split lengthwise so that the underneath portion, which is marked as a protractor, can be held against the drawing board while the upper part can be rotated on a swivel joint to draw angular lines up to 35° above or below horizontal. The movable head can be clamped in any position. Also available are an improved lettering instrument and a projection box for teaching orthographic projection. For prices and additional information, write to O. A. Olson Co., 712 Tenth St., Ames, Iowa, mentioning SCHOOL SHOP; *or check no. 14 on the coupon.*

Pull-Push Steel Rule



Stanley Tools now offers a new Defiance "Pull-Push" flexible steel rule in 6', 8', and 10' lengths. White enamel is baked on face of nickelplated, replaceable blade for extra wear. The ½" blade has large, black, easy-to-read numerals. For prices and complete information, write Stanley Tools, New Britain, Conn., mentioning SCHOOL SHOP; *or check no. 15 on the coupon.*

New Twist Drill Catalog

A complete line of twist drills is featured in a new 12-page illustrated catalog offered by The DoAll Co. Information is given on taper shank drills (including odd sizes), various types of straight shanks, three- and four-fluted drills, drill sets, DoAll chatter-free countersinks, combined drill-countersinks, hardened and ground sleeves and sockets, and carbide-tipped masonry drills. For a free copy, write for Catalog 51-816 from The DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill., mentioning SCHOOL SHOP; *or check no. 16 on the coupon.*

Mak-a-Clok Kit

Here is the newest homecraft sensation. The kit includes complete assembly for making a fine clock worth $25 or more, together with full instructions and easy-to-follow photos. There are six handsome designs to choose from. Genuine Sessions movement. A valuable project at a great saving. May be finished in walnut, mahogany, natural wood, or colors. Each set $8.95. For details, write School Products Co., 111 Hudson St., New York 13, N.Y., mentioning SCHOOL SHOP; *or check no. 17 on the coupon.*

Knife Grinding Attachment

The Delta Power Tool Division of the Rockwell Mfg. Co. announces a new knife grinding attachment for the Delta 8" Jointer, which permits resharpening of blades without removing the cutterhead from the machine. The result is precision accuracy grinding with the saving of much time and effort. For details, write the company at 600 E. Vienna Ave., Milwaukee, Wis., mentioning SCHOOL SHOP; *or check no. 18 on the coupon.*

New Literature

"More Brilliant Projection." new booklet issued by Radiant Manufacturing Corp., 1204 S. Talman Ave., Chicago 8, Ill., is a detailed analysis of many projection problems. The most up-to-date technical data, interpreted in easy-to-understand language, provides an excellent grounding on the subjects of projectors, lenses, seating arrangements, screens, reflection, etc. Available without charge from the company (mention SCHOOL SHOP), *or by checking no. 19 on the coupon.*

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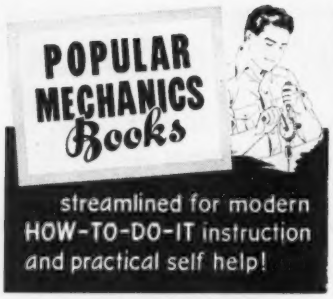

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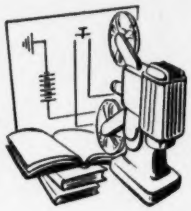

Books:

Standards for Automotive Service Instruction in Schools. Automotive Industry-Vocational Education Conference. Dearborn, Mich.: Ford Motor Co., 1951. Pp. 66. Free. (Paperbound).

This guide to school administrators and teachers for establishing or improving automotive service instruction in schools represents the combined thinking of educators from all over the country, and people who are actively engaged in the automotive service industry. It has been prepared by the AI-VE Conference on Public School Automotive Instruction, set up cooperatively by the American Vocational Association and the automotive industry. For copies, write on school letterhead to AI-VE Conference, 320 New Center Bldg., Detroit 2, Mich.

Television Service Manual. Anderson. New York: Theo. Audel & Co., 1951. Pp. xi + 384. $2.

A practical service manual for installing, repairing, and maintenance of TV receivers. Common receiver faults are illustrated and their causes and remedies explained. A step-by-step technical description of typical television receiver circuits is given. Much space is devoted to antenna arrays.

Edwin P. Anderson is on the staff of Theo. Audel & Co.

Walt's Workshop. Durbahn. Chicago: Hobby Books Div. of *Popular Homecraft*, 1951. Pp. 144. $2, less 20 percent trade discount. (Paperbound.)

This practical workbook for the home craftsman explains in simple language the construction of 42 projects for the workshop, home, and garden. Illustrated with large working drawings and photos. All the projects have been built and used successfully. Originality in design and simplicity of construction are stressed.

Walt Durbahn, an experienced craftsman and author, is chairman of vocational education and building trades instructor at Highland Park, Ill., High School.

Etching, Spinning, Raising and Tooling Metal. Smith. Bloomington, Ill.: McKnight & McKnight Publishing Co., 1951. Pp. 88. $1.50. (Paperbound). Revised Edition.

The many varied ways of working metal are explained step by step with the aid of diagrams in this workbook. Processes are emphasized rather than specific projects. Information about metals, tools, and equipment basic to understanding the forming and decorating of metal is included.

Robert E. Smith was formerly professor of education, Ohio State University, Columbus.

Craftsman's Handbook. Parisi. New York: Educational Materials, Inc., 1951. Pp. 96. $2. Rev. Ed.

More than 300 fully illustrated handicraft processes and projects for school and home are included in this enlarged edition. Simple directions are given for carving; working clay, metal, jewelry, plastic, leather, fabrics, felt, and cork; stenciling; silk screen; dyeing; bead weaving, coping saw, bookbinding, etching, block printing, finger painting, stick printing, mask making and figurines, and photographic coloring.

Tony Parisi is on the staff of Educational Materials, Inc.

What to Make with Concrete. Chicago: Popular Mechanics Press, 1951. Pp. 112. $2.

A profusely illustrated project book for the home, garden, and farm. Both utilitarian and decorative items are included. Special sections on sewage-disposal systems for farm and suburban homes; making concrete blocks, swimming pools, walks, etc.; and "concrete kinks".

Merry Old Mobiles. Sibley. Chicago: Goodheart-Willcox Co., Inc., 1951. Pp. 96. $2.50. (Paper-bound, $1.)

A collection of interesting photos, drawings, and cartoons of pioneer autos.

Hi Sibley, the author, has had personal experience with many of the cars described.

Simplified Mechanics and Strength of Materials. Parker. New York: John Wiley & Sons, 1951. Pp. xiv + 275. $4.

This book has been written as an engineering textbook and as a practical elementary guide for men interested in mechanics and construction. The aim is to provide data to enable the reader to understand more fully the theory of the design of structural members of various materials.

Harry Parker is professor of architectural construction, School of Fine Arts, University of Pittsburgh, Pa.

Air Conditioning in Summer and Winter. Holmes. New York: McGraw-Hill Book Co., 1951. Pp. xiv + 352. $5.75. Rev. Ed.

The author has thoroughly revised the material in this edition to bring up to date all procedures, tabular data, descriptions, and illustrations of equipment. Additional information is given on refrigeration systems, and a new chapter has been written on reciprocating and centrifugal compressors.

Richard E. Holmes is chief engineer, air conditioning and refrigeration division, Worth-

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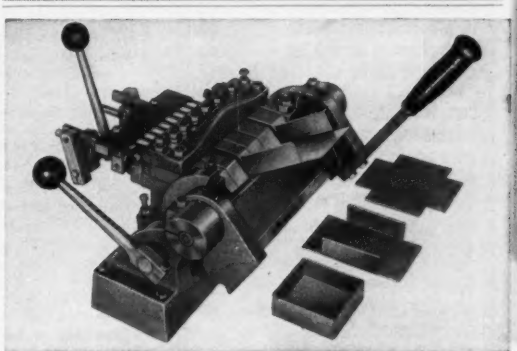

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Pamphlets:

Digest of Annual Reports of State Boards for Vocational Education. Charts and tables throughout the 96-page text summarize the data reported in detail in the statistical appendix. Enrolments, expenditures, training programs, special activities, publications, etc., in all branches of vocational education are presented. Compiled by U. S. Office of Education for fiscal year ended June 30, 1950.

Resource Units for Industrial Arts in Wisconsin Schools. The application of the resource idea in industrial arts—centering educational experiences around real-life situations—is explained in this bulletin. It is the second in a series of curriculum publications prepared by the Statewide Industrial Arts Committee of the Wisconsin Cooperative Educational Development Program. The material was prepared in the graduate program of The Stout Institute, and is published and distributed by the State Department of Public Instruction, Madison.

The Story of Lumber and Allied Products. The Story of Paper. Two new 16-page pamphlets published by the American Forest Products Industries, 1319 Eighteenth St., N.W., Washington 6, D.C. Free.

Training Manpower for Defense Production. A four-page article reprint from the June issue of *Mill & Factory*, written by W. F. Patterson, director, Bureau of Apprenticeship, U. S. Department of Labor. The difference between training for skilled trades and that for other production and assembly-line jobs is explained. Copies are available free from the Bureau, Washington 25, D. C.

How to Repair Electrical Appliances and Circuits. A 60-page home repairman troubleshooting booklet illustrated with photos and a typical house-wiring system. The author, Robert Hertzberg, is the author of many magazine articles on radio and electricity. Available for 25c from Superior Publishing Co., 227 Fulton St., New York 7, N. Y.

Tool and Diemaking Workbook and Tool and Diemaking Testbook. A new apprentice-training course prepared for the California State Department of Education, Sacramento. Subjects covered are: tools, jigs, and fixtures; gages; and punch press, forging, die-casting, and plastics dies. Each section is prepared by an expert craftsman in that field. Victor Wrasse is instructor at Laney Trade and Technical Institute, and tool and diemaker for the Friden Calculating Machine Co., Oakland; Herbert Zechman is tool and diemaker for Hubbard & Co., Emeryville; and John G. Robb is plastics engineer, American Molding Co., San Francisco. The workbook and testbook are each $2, and the final examination, 15c.

Opportunities in the Printing Trades, in Motor Transportation, in Photography, in Television, in Architecture, in Atomic Energy. Five new titles in the Vocational Guidance Manual Series (Grosset & Dunlap, New York), covering the topics which youngsters want and need to know in order to intelligently choose their vocation and prepare themselves for employment in these fields. 112-148 pp. $1 each, discounts on quantity orders.

The respective authors are: Patrick Boughal, instructor in the New York School of Printing; Charles B. Rawson, Editor of the *Commercial Car Journal*; Jacob Deschin, Photography Editor of *The New York Sunday Times*; Jo Ran-

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Add Power to Your Hands and **Pliers: Their Care and Uses** are two new 10-min., 16mm black-and-white sound films. They show the making of good hand tools, how to use them for best results, how to care for them for long usefulness, and how to make simple, practical repairs on them. Available free (user pays return shipping cost) from Utica Drop Forge & Tool Corp., 2415 Whitesboro, Utica, N. Y.

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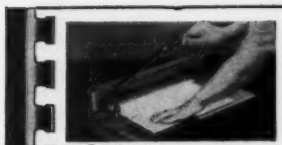

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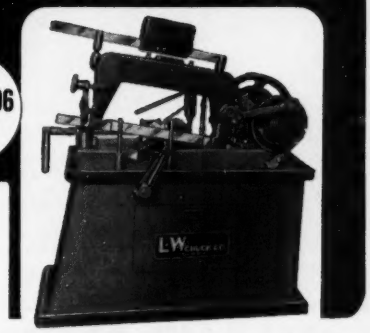

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vocational education, as now operated, is not performing the job that has to be done.

The American public—the masses, if you will—have demonstrated that when a problem arises, it demands action, and it usually doesn't care very much where it gets the action.

In the words of one leader—M. D. Mobley of AVA—unless the USOE and the public school system recognize the full capabilities of vocational education, the job of training will be given to some other agency.

Therein lies a grave danger, it is felt, not only to the educational program but to the existence of the so-called American way of life.

Totalitarianism of any variety thrives on ignorance, and to remove vocational training from the nation's educational system would deprive a large number of young men and women of the general education received along with their vocational training under our present system.

To remove vocational training from the educational system would make of it only a glorified apprenticeship program. The finished product would be mechanically skilled, but his or her mental development, his appreciation of the responsibilities of citizenship, his training for living would be at best the eighth-grade level.

A strong, integrated vocational program is, in the opinion of Mobley, a bulwark against communism. This is not a new theme with the AVA executive secretary. He first brought it out in 1946.

Industrial Education Enrollment Up.—The 1948-49 secondary-school enrollment in industrial education subjects was 1,434,302, 5.6 percent higher than that of 1933-34, a U. S. Office of Education survey just released indicates. Its figures show that 26.6 percent of public secondary-school pupils were en-

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rolled in industrial-arts and vocational-education subjects combined in the 1948-49 school year. This survey, detailed in a booklet entitled *Offerings and Enrollments in High-School Subjects, Chapter 5, 1948-49*, is the first to be made in 15 years. The increase in industrial-education subject enrollment was third largest of all secondary-school subjects, close behind that in typewriting (5.8 percent). The greatest increase (7.5 percent) was in home economics.

The enrollment in industrial-arts in junior-high schools in 1949 amounted to 48.2 percent of all pupils enrolled, or practically all the boys attending.

General shop, woodworking, and mechanical drawing, have the largest enrollments in industrial arts, accounting for three-fourths of the total. Metalwork, with 193,000 or 2.8 percent of all pupils, is next, followed by printing (85,000 and 1.2 percent), electrical work (64,000 and .9 percent), handcrafts (31,000 and .5 percent), and auto mechanics (22,000 and .3 percent). Large increases were reported in photography, home mechanics, handcrafts, and plastics over the 15-year period.

The largest vocational enrollments in separate trade subjects were in machine shop (44,000), auto mechanics, electrical work, cabinet making, carpentry, and printing (13,000). New programs reported were: general industry, diversified occupations, radio, and aviation. The estimated number of pupils enrolled in preparatory trades and industries courses was 250,000, subtracting the nearly one-fourth who were enrolled in shop mathematics, trade science, and other vocationally related subjects, and much of the one-fifth who were taking mechanical drafting.

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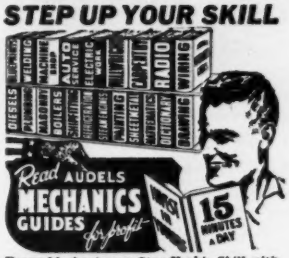

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Educators Optimistic.—Educational circles are optimistic these days, confident that one more attempt to scatter federal educational activities has been halted.

Summary of testimony on S. 1149, the bill to reorganize the Department of Agriculture, which included a proposal to transfer U. S. Office of Education's Agricultural Education Service to USDA, indicates it has little opportunity of favorable action when Congress returns in January.

There was no single section of the measure which was not attacked from one source or another. Veteran observers believe it to be impossible to write a bill overcoming all of the objections to the bill.

Educational leaders base their optimism on this and the fact that Senators and Representatives are now at home, meeting their constituents and probably teachers of vocational agriculture.

Almost to a man, these teachers are opposed to the transfer. M. D. Mobley, executive secretary of the American Vocational Association canvassed all chief state school officers and their assistants for vocational education. Through the Vocational Agriculture Association, 13,000 teachers were canvassed. An overwhelming majority were opposed to the transfer, he reported.

One of the principal fears was that vo-ag might be swallowed by a larger organization, more effectively submerged and forgotten than they feel they now are in the USOE. Teachers interpreted the proposal, as well as the testimony of Dean Rusk (SCHOOL SHOP, October), as an effort to confine them to the classroom, by separating adult education from the program.

Vo-ag people are also hopeful of more consideration from USOE, following a great deal of sharp criticism included in testimony, and the admission of Commissioner Earl McGrath in his testimony that his organization was deserving of criticism.

USOE Fumble.—U. S. Office of Education fumbled the ball once more in connection with the annual convention of Future Farmers of America.

One of the reasons why vo-ag feels it is not getting full cooperation from USOE powers-that-be is the failure of high brass to participate in FFA meetings.

At this year's meeting in Kansas City, the Department of Agriculture, which eyes vo-ag, sent Knox Hutchinson, an assistant secretary. The highest level from Federal Security Agency was R. W. Gregory, Deputy Commissioner of Education.

Obviously, in Washington's bureaucracy, an agency can't match, in protocol, an assistant secretary. But fresh from some very sharp criticism on Capitol Hill, it was considered unusual that publicity, and public-opinion conscious Oscar Ewing, FS Administrator, didn't see to it that his agency did proportionately as well as USDA.

AVA Convention. — American Vocational Association conducts its annual convention November 25-30, at Minneapolis, Minnesota. Its convention program is nearly completed, and highlights will include these features:

Opening session: addresses by Dean M. Schweickhard, Minnesota Commissioner of Education, "Preservation of Freedom," and Dr. Evelyn M. Duvall, executive secretary, National Council on Family Relations, "Keeping People Home."

At the second general session, addresses will be made by Governor C. Elmer Anderson of Minnesota and Henry C. Bennett, Administrator, Technical Cooperation Administration ("Point IV").

Sen. Hubert H. Humphrey of Minnesota will be the banquet speaker.

Meanwhile constituent groups of AVA will be conducting individual panel sessions, where vocational problems will be discussed.

Danger Still Seen.—Although victory is in sight in the fight to retain vo-ag activities in the U. S. Office of Education, educational leaders here view the opposition effort with uneasiness and fear that danger flags should be kept hoisted.

This effort to divorce vo-ag from USOE, following a bill in the Eighty-first Congress to divorce T & I and transfer it to Labor, is seen as a straw in the wind.

The premise is made that a job must be done, education-wise. Young men and women must be trained. Education itself recognizes this, and is addressing the problem.

The conferences on life adjustment—one of which was conducted in early October—are examples of attention being given the problem of practical application of education.

The many alterations in formal curriculums and teaching methods to achieve this end is another example. The highly successful project undertaken in the community of Culloden, W. Va., (described in a USOE bulletin *The Culloden Story*) is considered an excellent example of life adjustment teaching.

But—the effort to shift various educational functions from USOE is considered proof in many quarters that

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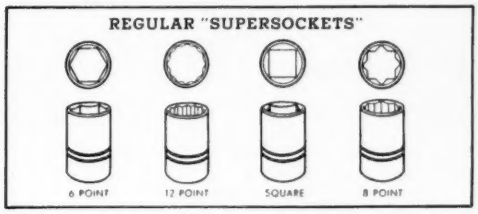

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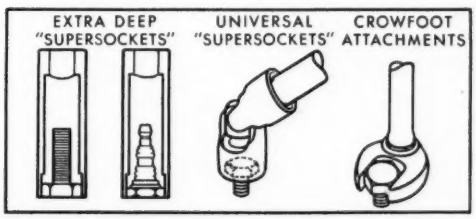

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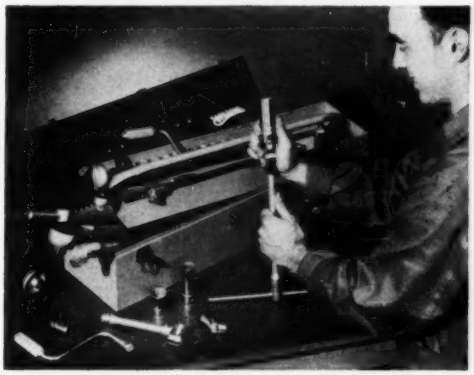

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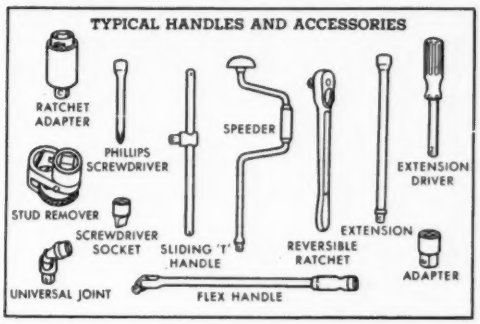

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